World Petroleum

DECEMBER, 1952

five dollars per year • one dollar per copy

a tiny button you may not notice

is one great assurance of "perforating jobs done right!"

You don't get much chance to see this button, because usually your Lane-Wells man won't have it on his work shirt. But you'd be surprised to know how many Lane-Wells men have these buttons, which tell of five, ten, fifteen or more years of continuous service with Lane-Wells.

These service buttons represent your greatest assurance of a job done right, because they represent oil field experience—and the reservoir of knowledge that comes with it. The men who can wear these buttons have met nearly every perforating problem an oil well can throw at you, and when the answers weren't in the book, they've made their own answers—and seen them become standard practice in one field after another. The thousands of man-years of experience these buttons represent—the oil field know-how gained in 170,000 perforating jobs—are why...

Operators from California to Kentucky can tell you

Call LANE WELLS for Better Perforating

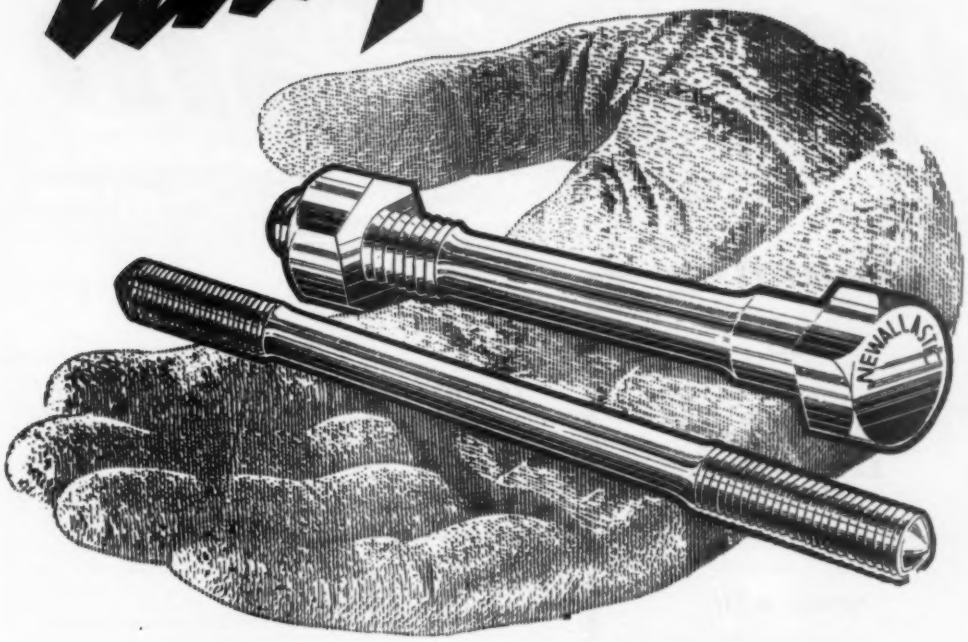
Tomorrow's Tools-Today!

AG-505

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

Unique



"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

POSSILPARK GLASGOW · N

fire fighting foam

and

CO_2

PYRENE FIRE EXTINGUISHER LIQUID

SODA ACID

WATER-GAS EXPELLED

CO_2 DRY CHEMICAL

Full particulars and specifications of this comprehensive range of fire fighting equipment will be supplied without obligation by applying to Dept. WP. 12.

for extinguishing all types of fires in oil refineries and tank farms

The Pyrene Foam Division have concentrated for many years on the production of stable, durable foam capable of extinguishing bulk fires involving oils, spirits, alcohols, solvents and other highly inflammable liquids. These foam compounds are now being supplied to refineries, tank storage depots and large chemical works all over the world for application by means of "PYRENE" Foam-making Branchpipes, Mechanical Foam Generators, "PYRENE" Foam Tenders and various forms of portable equipment. All other fire risks are also covered by various "PYRENE" Fire Fighting Appliances, using every known fire fighting agent.

THE PYRENE COMPANY LIMITED

9, Grosvenor Gardens, London, S.W.I. England

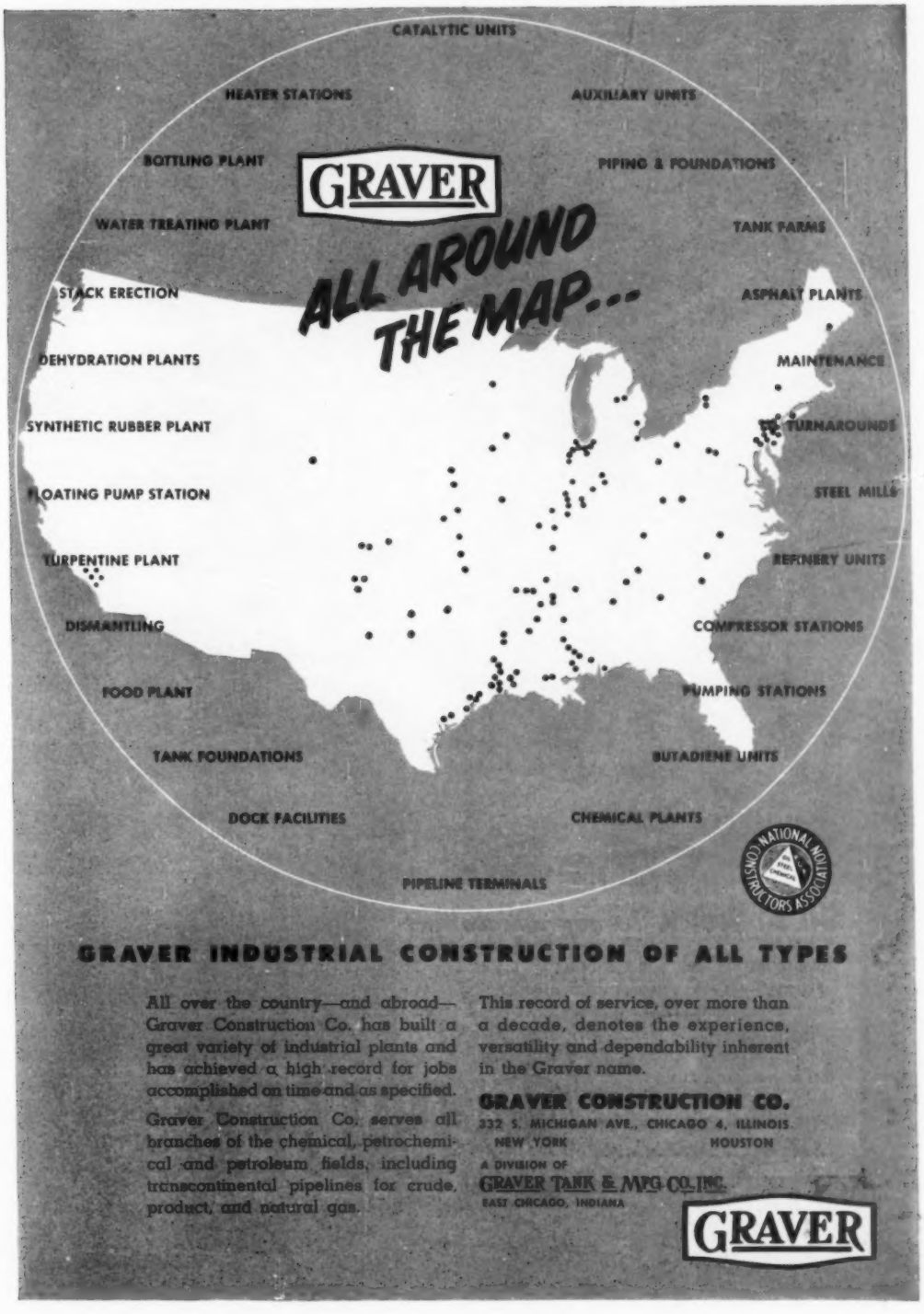
Cables: Pyrene London

Head Office and Works: Great West Road, Brentford, Middlesex.
Associated with:—Pyrene Manufacturing Company, Newark, New Jersey, U.S.A. and Pyrene Manufacturing Company of Canada, Limited, Toronto, Ontario, Canada.

Pyrene TRADE MARK FIRE FIGHTING EQUIPMENT

WORLD PETROLEUM for December, 1952. Vol. 23, No. 13, December 1952. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 604 Fifth Ave., New York 20, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies $1.00.

Copyright, 1952, by Mona Palmer, Trustee.



GRAVER INDUSTRIAL CONSTRUCTION OF ALL TYPES

All over the country—and abroad—Graver Construction Co. has built a great variety of industrial plants and has achieved a high record for jobs accomplished on time and as specified.

Graver Construction Co. serves all branches of the chemical, petrochemical and petroleum fields, including transcontinental pipelines for crude, product, and natural gas.

This record of service, over more than a decade, denotes the experience, versatility and dependability inherent in the Graver name.

GRAVER CONSTRUCTION CO.
332 S. MICHIGAN AVE., CHICAGO 4, ILLINOIS
NEW YORK HOUSTON
A DIVISION OF
GRAVER TANK & MFG. CO. INC.
EAST CHICAGO, INDIANA

GRAVER

OIL AT WORK - halfway 'round the World
Quality marine fuels and lubricants are the life line of energy -- for over-water movement of men, merchandise and materials. At more than 350 world ports Caltex provides quality marine lubricants. And at principal ports half the world over Caltex quality marine fuels are available.
SERVING Europe...Africa ...Asia...Australasia
CALTEX
PETROLEUM PRODUCTS

Sailor Beware! The Old Man of The Sea!

WHO has not read of Sinbad, as told in the Arabian Nights by glamorous Scheherazade?

Shipwrecked on a strange island, the unfortunate sailor came upon a weak old man. Moved by compassion, Sinbad took the feeble fellow on his back, carried him over the brook, gathered fruit and fed him. But when Sinbad asked him to get down, the old man refused, wrapping his legs about his neck, almost strangling him.

The sailor fainted and fell down, yet the old man clung ever closer. He rained blows on Sinbad, driving him about without rest, to pick fruit and do his pleasure. This went on and on, until the desperate sailor made wine from wild grapes to appease his own plight. One day noting Sinbad's pleasure, the old man snatched a gourd of wine and gulped it down. Completely drunk, he loosened his grip and Sinbad threw him off. Saved by a passing ship, his rescuers said, "You are the first ever to escape strangling by the Old Man of the Sea".

Dating back hundreds of years, the Old Man is an allusion familiar to everyone. He is a warning figure today. Our nation, surviving the storms of two world wars, wanders down strange ways. With kindly intent and glorying in its own strength, America is tempted to shoulder the Old World and its age-worn problems. But weak and feeble as the Old World appears to be, let us beware! How easy to assume a burden which would quickly exhaust our strength, strangle us as a nation, and in the end leave the world as weak and exhausted as it was before our foolish undertaking!

QUALITY YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio

Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

How much can WORTHINGTON do for a refinery?

For many decades, Worthington has been known around the world for refinery equipment and the engineering service that goes with it.

If you were to classify this equipment and service into 3 product lines and 3 services, you might do it something like this:

Equipment: **1. Process pumps, 2. Gas-engine compressors, 3. Refrigeration equipment.**

Service: **1. Before you buy, 2. When you buy, 3. After you buy.**

If you're not already familiar with it, you'll want to learn more about these well-known Worthington products and engineering aids. You can do this by calling on your nearest Worthington representative or by letter—stating specific requirements—to Worthington Corporation, Export Department, Harrison, N. J., U.S.A.

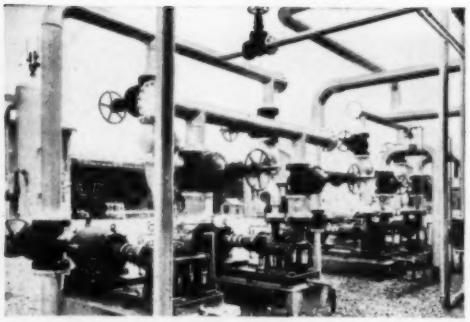
What Worthington Engineering Service Means To You

1. Before you buy, Worthington gives valuable advice in the correct selection of equipment for each specific application. You benefit from Worthington's century of experience.

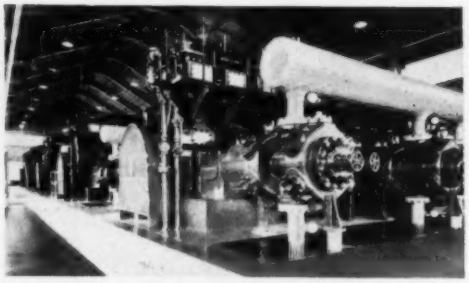
2. When you buy, Worthington engineers are available to supervise installation, advise operators and maintenance men and to see that equipment operates properly.

3. After you buy, Worthington provides competent service—engineering advice on new problems, quick availability of spare parts.

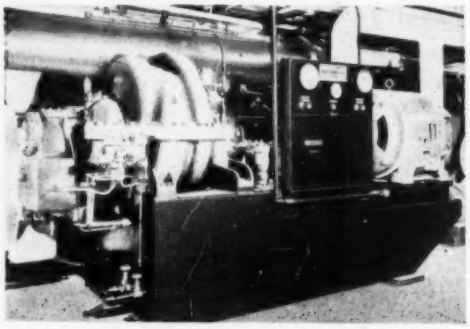
You can buy Worthington products manufactured at these plants in corresponding local currency: Argentina, Austria, Brazil, England, France, Germany, Italy, Mexico, Spain, U.S.A. P.2.33



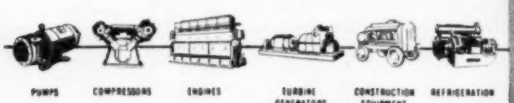
PROCESS PUMPS—the right pump for every job. Many thousands of standard combinations, capacities, casings, mounting and drive arrangements. To oilmen around the world, Worthington means the *world's broadest line* of pumps.



GAS ENGINE-COMPRESSORS—like these five of 25 similar units on the newest gas pipeline in the U. S.—offer operating flexibility and efficiencies only now available after many years of Worthington research.



REFRIGERATION EQUIPMENT—like this installation of centrifugal compressors—is part of the complete Worthington refrigeration line that includes horizontal compressors, booster compressors, vertical ammonia compressors as well as other lines.



WORTHINGTON

The Sign of Value Around the World

What's NEW

In Perforating, Logging, and Fishing Tool Services

McCULLOUGH®
NEW SERVICES • NEW TOOLS
NEW WAYS OF DOING THINGS

Latest News About New Tools, Techniques and Services

140,000 LB. BLOWS FOR 36 HOURS

Rugged McCullough Double Acting Rotary Jars Still in Perfect Condition After Recovering Fish

Field Report on this Amazing Job:

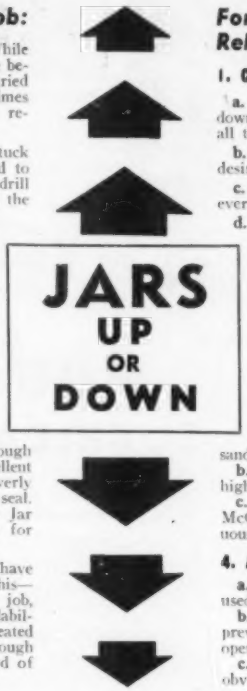
It was an isolated location in Canada. While drilling at 1450' with a 9" rock bit, the drill pipe became stuck in a spiral key seat. The contractor tried to free the pipe by working and circulating, at times pulling as much as 310,000 lbs., but the pipe remained stuck.

The McCullough Magna-Tector located the stuck point and the McCullough String Shot was used to back off the drill pipe. Five drill collars and the drill pipe were recovered, leaving one drill collar and the 9" rock bit in the hole.

The contractor screwed back into the drill collar with a McCullough Safety Joint and a 4½"McCullough Double Acting Rotary Jar, with eleven drill collars above the rotary jar. After jarring continuously for 12 hours, striking blows 140,000 lbs. above the weight of the drill string, it was thought advisable to recover the drill collar and bit by washover operations. However, 7⅝" wash pipe was not available in the area so jarring was continued. After 36 hours, continuously striking 140,000 lb. blows, the fish was recovered.

Two cones were completely sheared from the rock bit and one was bent in. The McCullough Double Acting Rotary Jar was still in excellent condition. The striking surfaces were not overly worn and the packing still provided a perfect seal. Had it been necessary, the McCullough Rotary Jar could have continued under this severe usage for many more hours.

McCullough Double Acting Rotary Jars have been used on hundreds of jobs as severe as this—some a great deal tougher. But, whatever the job, the operator can be sure of one thing—dependability. And this dependability—consistently repeated for more than 20 years, has earned McCullough Rotary Jars the reputation of being the standard of reliability in oil fields everywhere.



For 20 Years the Standard of Reliability Because:

1. CONTROLLED POWER

a. The force and direction of the blow (up or down) is under complete control of the operator at all times.

b. McCullough Rotary Jars strike blows **only** when desired.

c. Blows struck are solid, uniform, metal-to-metal every time.

d. Heavy sections of solid steel give striking surfaces and releasing teeth strength and durability far beyond that of any jarring tool.

2. SIMPLICITY

a. McCullough Double Acting Rotary Jars consist of only two major parts and the packing—no complicated mechanism to fail, no joints to come unscrewed.

b. The need of a bumper sub is eliminated—McCullough Rotary Jars do all the work.

3. DEPENDABILITY

a. Open construction prevents the jars from sanding up or freezing.

b. McCullough Rotary Jars will stay packed under high pressure drilling and testing operations.

c. Rugged strength and dependability make McCullough Rotary Jars most practical for continuous use in the drill string.

4. ADAPTABILITY

a. McCullough Rotary Jars have been consistently used with all makes of testers.

b. Complete control of jarring action, mentioned previously, means complete adaptability to any jarring operation.

c. Extra large diameter circulation hole with many obvious benefits.

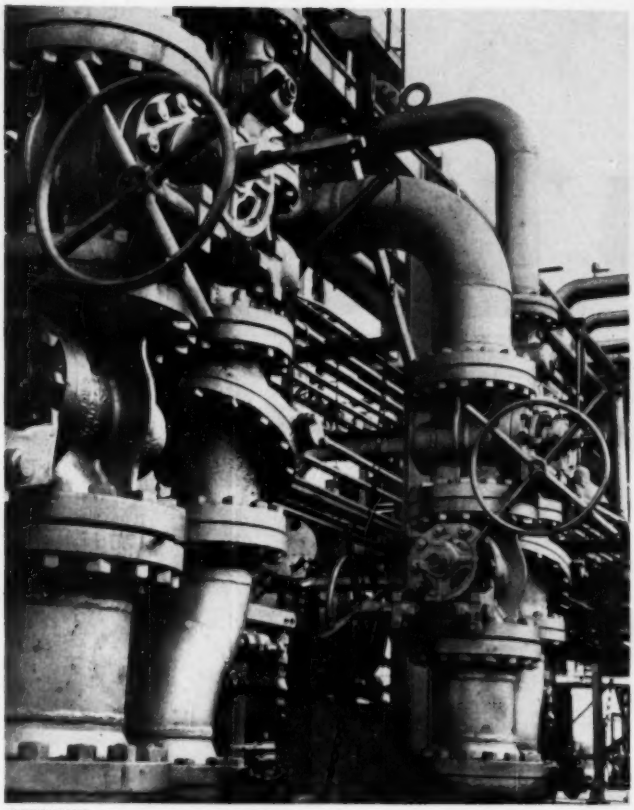
WRITE FOR TECHNICAL BULLETIN #501 for complete description of the McCullough Double Acting Rotary Jar, illustrations, specifications, and many more actual job reports—actual jobs that may help you save hours of rig time the next time you need rotary jars.

PERFORATING, RADIATION LOGGING, AND FISHING TOOL SERVICE—ANYWHERE—ANYTIME.

McCULLOUGH TOOL COMPANY
5820 South Alameda Street, Los Angeles 58, California
405 McCarty Street (P. O. Box 2575) • Houston, Texas

EXPORT OFFICE: Los Angeles, California
CANADA: Edmonton, Calgary, Grande Prairie, Alb.; Regina, Saskatchewan
VENEZUELA: United Oilwell Service Co., S.A.; Caracas, Anaco, Maracaibo

SERVICE LOCATIONS: TEXAS: Houston, Snyder, Alice, Cisco, Corpus Christi, McAllen, Odessa, Tyler, San Angelo, Victoria, Wichita Falls, Luling, Beaumont, Sherman, Midkiff, El Campo. **OKLAHOMA:** Oklahoma City, Guymon, Healdton. **MISSISSIPPI:** Laurel. **NEW MEXICO:** Hobbs. **KANSAS:** Great Bend. **WYOMING:** Casper. **CALIFORNIA:** Los Angeles, Avenal, Bakersfield, Ventura. **LOUISIANA:** Houma, Lake Charles, New Iberia, Shreveport. **COLORADO:** Sterling. **NORTH DAKOTA:** Williston. **UTAH:** Vernal.



REFINING Gear-operated Audco-Nordstrom valves in Canadian Refinery

PRODUCTION Arabian oil field Christmas tree fabricated with Audco-Nordstrom valves

DISTRIBUTION Audco-Nordstrom valves control fuel hose lines in England

PIPE LINE Both wrench and gear-operated Audco-Nordstroms on Belgian pipe line

For Every Kind of Petroleum Service

Audco-Nordstrom
LUBRICANT SEALED VALVES

These basic design principles make Audco-Nordstrom valves the Number One world choice for petroleum services:

. . . Self-adjusting tapered plug. Instead of wedging or grinding against the seat, it rotates smoothly on a film of lubricant.

. . . Lubricant sealed ports. "Sealdport" internal system of lubrication gives a doubly-tight shut-off.

. . . Quickest operation. Only a quarter turn from fully open to fully closed.

. . . Compact. No high yokes or bonnets, no underhanging body, no external threads to corrode.

. . . Seat never exposed. Abrasive dirt can't get to the critical seat port areas.

With Audco-Nordstrom valves, there's no guessing. You have the recommendation of world-wide installations in all major types of petroleum service. Performance is your proof.

Audco-Nordstrom *Lubricant-Sealed Valves*

BRITISH AMERICAN

ROCKWELL MANUFACTURING COMPANY
400 North Lexington Avenue
Pittsburgh 8, Pennsylvania

Export: International Division, Rockwell Manufacturing Co., 7701 Empire State Building, New York 1, N. Y.

Canadian Licensees: Peacock Bros., Montreal, Quebec.
AUDLEY ENGINEERING COMPANY, LTD.
Newport Shropshire, England

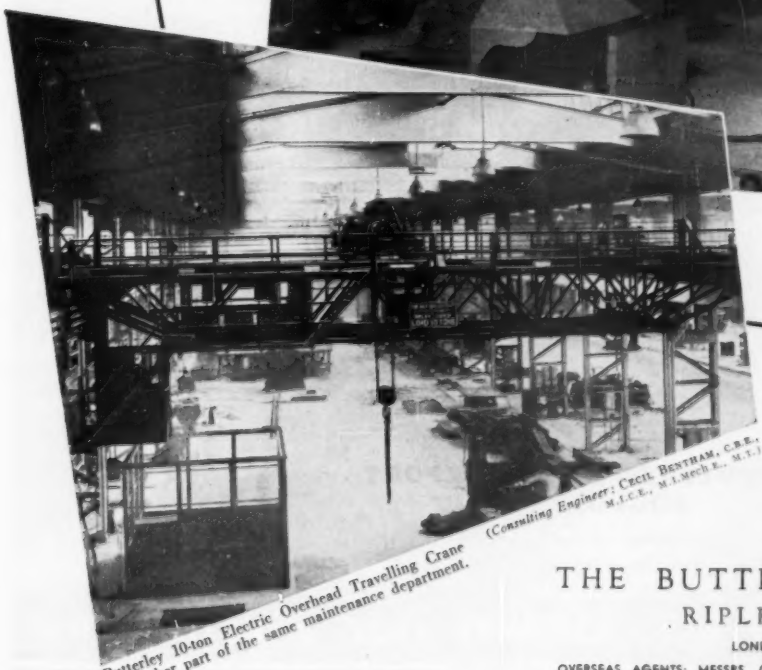
Overseas Agents located in South Africa, Australia, India, Trinidad, British West Africa, Finland, Norway, Sweden, France, Belgium, Switzerland, Italy, Roumania, Spain and Portugal.

N-5246

ELECTRIC OVERHEAD TRAVELLING CRANES

by BUTTERLEY

30-ton Butterley Electric Overhead Travelling Crane recently installed in the maintenance department of an important steel works.



Butterley 10-ton Electric Overhead Travelling Crane in another part of the same maintenance department.

(*Consulting Engineer*: CECIL BENTHAM, C.B.E., M.I.C.E., M.I.Mech.E., M.I.)

THE BUTTERLEY COMPANY LIMITED

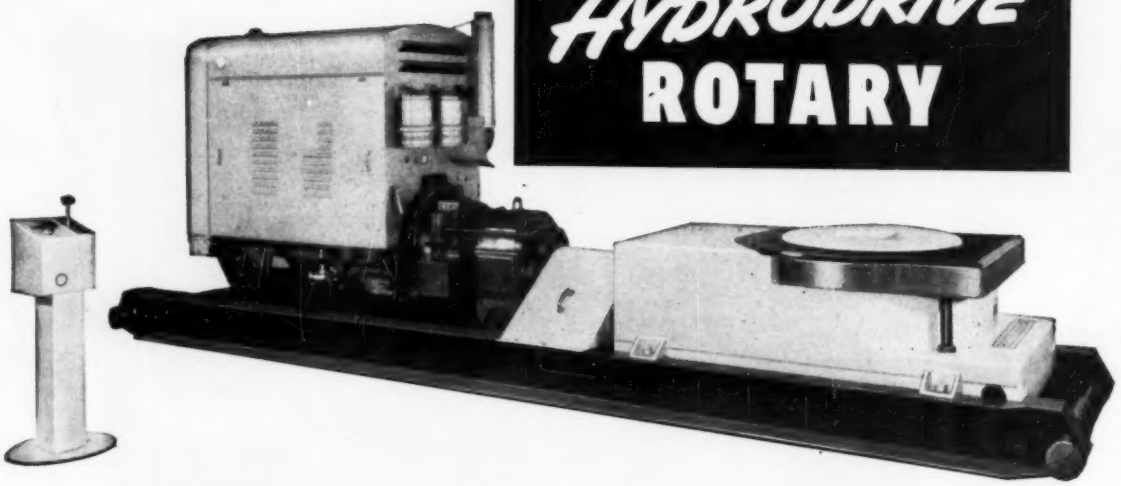
RIPLEY · DERBY · ENGLAND

LONDON OFFICE: 20 ASHLEY PLACE • VICTORIA • S.W.1

OVERSEAS AGENTS: MESSRS. CECIL TRESS & CO. LTD., AFRICA HOUSE, KINGSWAY, LONDON, W.C.2

EC24b

Why you're ahead with a BETHLEHEM *HYDRODRIVE* ROTARY



While Bethlehem makes and will gladly furnish rotary tables for drawworks hook-up, we'd like to point out the many advantages of the Hydrodrive rotary unit with independent engine.

First of all, what does Bethlehem offer in this respect? We offer the two most commonly-used sizes—21-in. and 17½-in., *both standard tables*. Either is available with gas or diesel engine and *torque-converter drive*. The system has *two forward transmission ratios, one reverse*.

The flexibility—"independence"—of Bethlehem's Hydrodrive tables makes possible great gains in your drilling set-up. For instance, there's reduced wear on the drawworks. There's complete control at the driller's fingertips. There's an infinite number of speeds from zero to maximum. With separate rotary drive, you are not draining power from the drawworks engines; more power, therefore, is available for the pumps.

Here are some other advantages: greater safety (no chain drives between drawworks and table) . . . more pipe-racking space . . . ready portability (fine for rathole digging) . . . drive and controls that make the units perfect for fishing.

Bethlehem Hydrodrive tables can be used at floor level or underneath the floor, whichever you prefer. And there are other features, too, that you'll want to investigate—because they mean an easier type of drilling. Write for information; complete details will be sent promptly.

Bethlehem also manufactures a complete line of slush pumps and drawworks for shallow, medium, and deep drilling; also crown and traveling blocks, and swivels; and, for production work, pumping units in a wide range of sizes and types. Ask for literature.

BETHLEHEM STEEL

BETHLEHEM STEEL EXPORT CORPORATION

25 Broadway, New York 4, N.Y., U.S.A.

Cable Address "BETHLEHEM, NEWYORK"

WHERE THERE IS NEED OF HEAT INSULATION

Kenyon provide a *complete* thermal insulation service to the oil industry, including technical advice on thermal insulation specifications, and finishes for all conditions. Supply of materials, application, supervision, on sites throughout the world.
The photograph shows view of furnaces on Pyrolysis Unit, Shell Chemical Plant, Stanlow, Cheshire, England.

A Shell Photograph

WM. KENYON & SONS (AMERICA) LTD., PERTH AMBOY, N.J., U.S.A.

WILLIAM KENYON & SONS LTD., DUKINFIELD, CHESHIRE, ENGLAND

IN THE APPLICATION OF RUBBER TO OIL PRODUCTION—

Part of the Shell refinery at Cardon in Venezuela. *(A Shell photograph)*

Service assures success—

Dunlop Oil Suction and Discharge Hose to British Standard Specification 1435 Type 3. This 8" bore hose is suitable for use at working pressures up to 225 lb./sq. in. Photograph shows the hose being checked for elongation under test pressure.

The Technical Advisory Service that Dunlop offers the oil industry plays a great part in *the consistent success* of Dunlop equipment in oil installations throughout the world. Experience of installations operating in every conceivable condition enables Dunlop experts to provide thoroughly practical, up-to-date guidance on new projects, extensions, replacements, repairs and development. In this way, the most efficient use is made of equipment designed for the job with characteristic Dunlop thoroughness.

The range of Dunlop products for the industry is indicated below. To take advantage of the Service offered, simply contact your nearest Dunlop distributor or representative — or write to the address below.

DUNLOP
A WORLD WIDE SERVICE TO THE OIL INDUSTRY

OIL SUCTION & DISCHARGE HOSE, SLUSH PUMP HOSE.
INDUSTRIAL HOSES for a wide range of uses in the Oil Industry such as welding, and pnuematic tool use.
V-BELTS to A.P.I. or B.S.I. Specifications.
FLAT TRANSMISSION BELTING.
VALVE INSERTS.
SWAB RUBBERS.
CEMENTING PLUGS.
PACK-OFF RUBBERS.
PISTON RINGS.

DUNLOP RUBBER CO. LTD. (GENERAL RUBBER GOODS DIVISION), MANCHESTER, ENGLAND

2GRG/612

Biggest PUSH and PULL on earth!

This combination is world-famous for agile power and efficiency: TD-24 diesel crawler and Bucyrus-Erie 16 cu.yd.(struck) capacity scraper.

On big jobs, there has to be a tractor that's tough, powerful, versatile! The answer is an International TD-24 with 148 max. drawbar hp. —more than any other crawler. It has proved its ability to work harder, to get in and out and back in again faster.

The TD-24 has 8 forward and 8 reverse speeds, up to 7.8 mph. for faster time cycles on the job. Syncromesh shifting is "on-the-go" shifting—instant change up or down one speed without declutching. Planet Power steering gives you pivot turns, feathered turns and turns with power on both tracks.

For all the facts on the TD-24, see your International Industrial Power Distributor now.

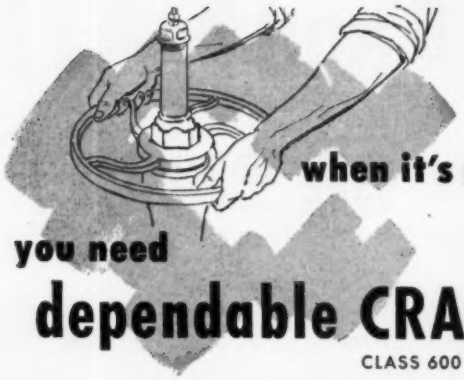
INTERNATIONAL HARVESTER EXPORT COMPANY

World-wide distributor of products manufactured by the International Harvester Company in the U.S.A. and by affiliated subsidiaries in Canada, the United Kingdom, France, Germany, Sweden, Mexico and Australia.

180 NORTH MICHIGAN AVENUE • CHICAGO 1, U.S.A.

INTERNATIONAL INDUSTRIAL POWER

Allied Equipment: *Bucyrus-Erie Tractor Equipment • Pullman-Standard Landclearing and Earthmoving Equipment • Superior-Cardwell Sidebooms and Angle-Fillers • M-R-S Diesel Wheel Tractors and Mississippi Wagons • Hough Payloaders • Carco Logging Equipment • Brookville Locomotives • Ready-Power Engine Generators*



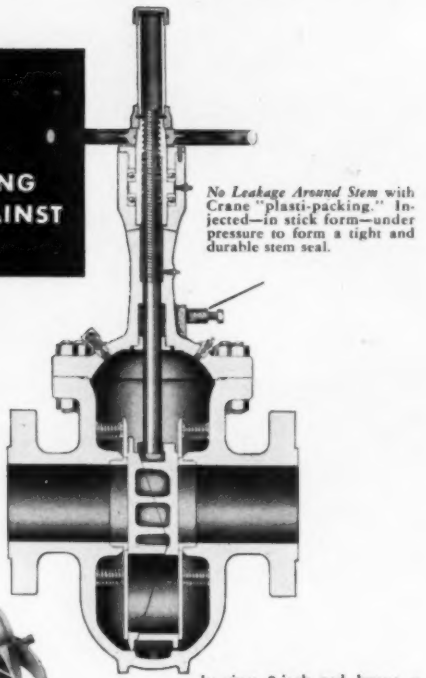
when it's a long time between turns...

you need

dependable CRANE pipe line valves

CLASS 600 GATES

they give you
- EASIER OPERATION
- TIGHTER SEATING
- SMOOTH, CLEAR FLOW
- COMPLETE GREASE SEALING
- BETTER PROTECTION AGAINST WEAR AND EROSION



No Leakage Around Stem with Crane "plasti-packing." Injected—in stick form—under pressure to form a tight and durable stem seal.

Infrequent operation—long exposure in toughest weather—can't affect the efficiency of Crane Pipe Line Gate Valves. All working parts are sealed in grease to assure smooth operation and positive closure of the dual-seating double disc. Spring-loaded plates retain grease in body during operation. There's no problem of erosion either, since disc is fully seated in open position as well as in closed position. Equally important, see how the conduit-type disc ports coincide with seat opening—note the absence of dirt-catching pockets. That means smooth flow with no turbulence, minimum pressure drop—and absolute minimum of internal wear from normal service.

Full-Way or Venturi patterns for working pressures up to 1440 pounds, oil or gas. Sizes 2 to 30-inch, Flanged or Butt-Welding ends. Full information contained in Circular AD-1864. Ask your Crane Representative, or write direct.

In sizes 8-inch and larger, a *new Spring Counterbalance Unit* keeps both sections of the wedge disc in alignment for quicker response—easier operation.

Spring-loaded plates retain grease in body while valve is being operated. In addition, they wipe foreign matter and excess grease from disc faces and help guide the disc.

The Complete Crane Line Meets All Your Valve Needs. That's Why
More Crane Valves Are Used Than Any Other Make!

CRANE VALVES

General Offices:
Crane Co.,
836 S. Michigan Ave.,
Chicago 5, Illinois, U.S.A.

In Great Britain:
Crane Ltd.,
45-51 Leman St.,
London E.1, England

In Canada
Crane Limited
1170 Beaver Hall Square,
Montreal, Quebec

Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

SIGN OF FRIENDLY SERVICE

FOR EVERYONE — EVERYWHERE!

SOCONY-VACUUM OIL COMPANY, INC.

and Affiliates:

MAGNOLIA PETROLEUM COMPANY • GENERAL PETROLEUM CORPORATION

NEWMAN - McEVOY VALVES

GIVE EFFICIENT DEPENDABLE SERVICE

These Valves have no equal for Christmas Tree and Flow Line service and are available in all sizes and for all working pressures normally required by the Oil Industry.

AUTOMATIC LUBRICATION CONDUIT GATE VALVE

Newman, Hender & Co. Ltd

WOODCHESTER GLOS. ENGLAND.

the good earth...made better

Most of nature's products require exacting scientific processing and manufacturing control before they are useful. MAGCOGEL, a concentrated colloidal material for drilling mud, is the result of just such processing. It is made from carefully selected Wyoming Bentonite and produced under rigid laboratory control in the world's most modern bentonite plant. Its highly effective gel forming characteristics provide faster, easier and safer drilling. Just add water to MAGCOGEL and you have a low-per-barrel-cost mud with all the properties of good drilling fluid except weight. Specify MAGCOGEL from one of Magcobar's 375 dealers who maintain complete stocks of drilling mud materials near your drilling operation.

Our Name is Mud!

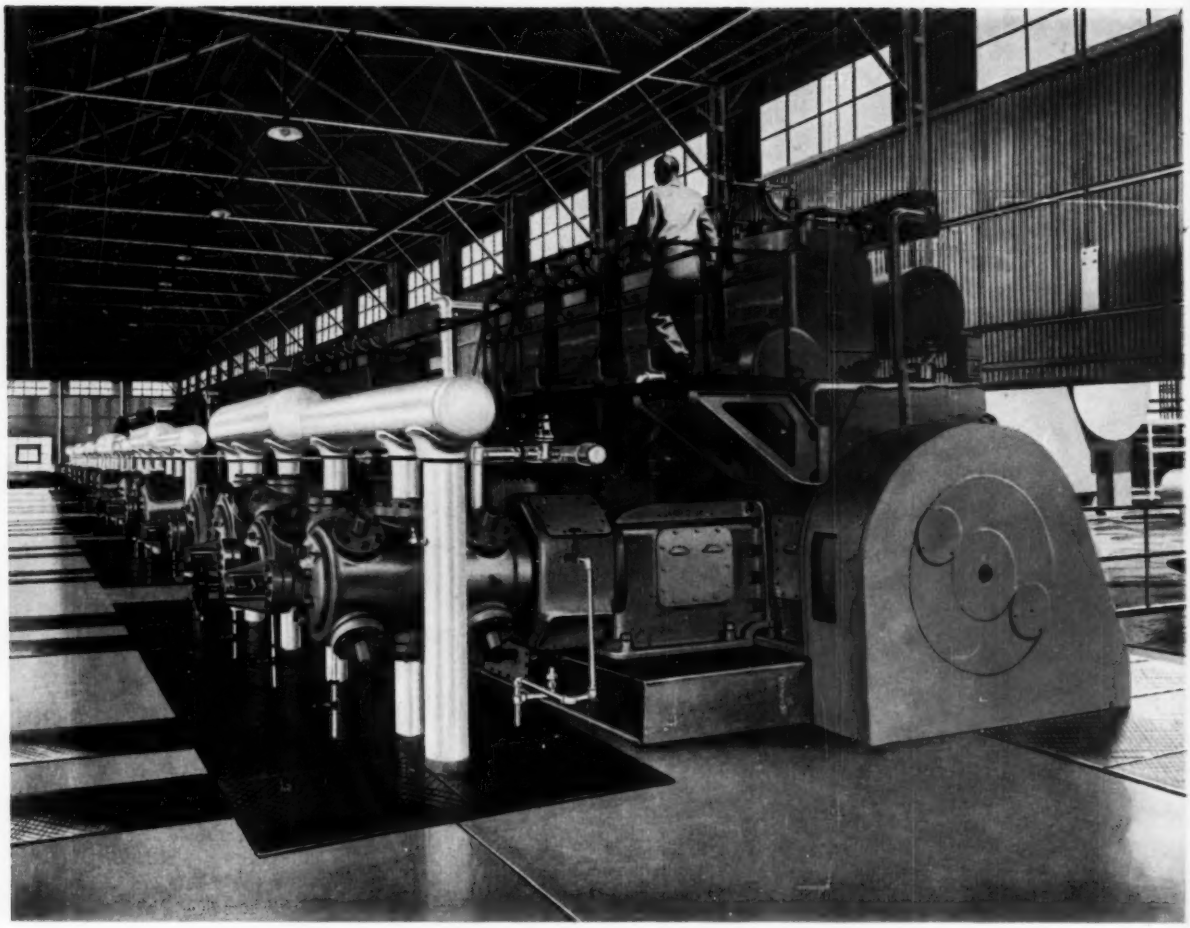
MAGNET COVE BARIUM CORPORATION

ONE OF THE DRESSER INDUSTRIES

HOUSTON, TEXAS

Magcobar
Complete
DRILLING MUD SERVICE
DEALER

MAGCOBAR • MAGCOGEL • HIGH YIELD • XACT CLAY • SALT GEL • MY-LO-GEL • MY-LO-GEL PRESERVATIVE • DRISCOSE
FORMAPLUG • CELL-O-SEAL • FIBER SEAL • MAGCO FIBER • LEATHER-FLOC • MAGCO MICA • JEL-OIL MUD • JEL-OIL "E"
"E" CONCENTRATE • NOHEEV • TANNATHIN • RED OX LIQUID • ALKATAN • QUEBRACHO • KEMBREAK • MAGCOPHOS • CHEMICALS



CLARK®

IS ONE OF THE DRESSER INDUSTRIES

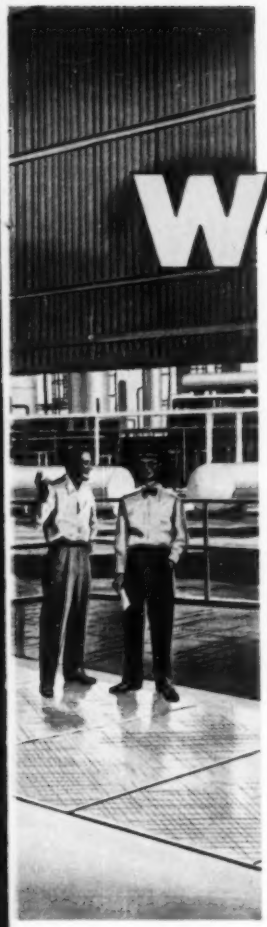
When the need is for heavy duty compressors, it is natural for industry to think of the leader in the field. Operating the largest and most modern plant in the world, for compressors and compressor prime movers, Clark Bros. is uniquely qualified to supply big units. Backed by forty years of experience, the Clark line today consists of every major type of compressor including gas, steam and diesel-engine-driven units, motor driven units and centrifugal and axial flow types.

Magnet Cove Barium Corp., *Houston, Tex., Malvern, Ark., Greybull, Wyo.* Magcobar drilling mud, Magcogel bentonite, Mylojel, Fiber Seal, Jel-Oil mud.

Clark Bros. Co. Division, *Olean, New York. Offices in principal cities throughout the world.* Engines and compressors—gas, steam and diesel driven.

Dresser Manufacturing Division, *Bradford, Pa.* Oil and gas and pipe couplings, fittings and sleeves—rolled and welded rings—welding fittings and flanges.

Kobe, Inc., Division, *Huntington Park, Calif.* Complete hydraulic oil field pumping systems, including the Kobe Free Pump.



No. 4 in a series about Dresser Industries

What is DRESSER INDUSTRIES

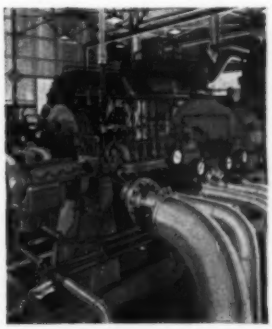
Dresser Industries, Inc. is one company—with the strength of many! A joint endeavor dedicated to producing the finest of integrated equipment and coordinated service for the oil, gas and chemical industries.

Each member company is an individual specialist and leader in its field. The parent, Dresser, incorporates many added services into its over-all administration, yet each company retains its individual identity and management. Such an integrated organization derives economies that are passed on to the operator along with the many other advantages of the specialized experience, know-how, research and development of each of these operating companies.

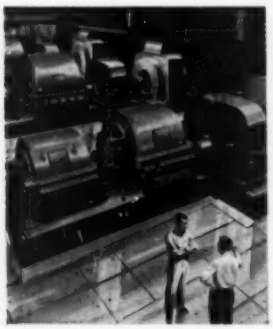
Dresser Industries is a vigorous, competent, far-reaching team to help meet efficiently the world's ever expanding energy requirements—a service unlimited—that makes your job easier, faster, more productive. This is your dividend from these combined operations—the DRESSER PLUS +

A large compressor installation represents a substantial capital expenditure. It calls for an unqualified management decision to choose the type of compressor best suited to the job. Building all types of compressors, Clark engineers can make truly unbiased recommendations for each job. Simple, rugged, highly dependable, Clark Compressors operate day and night around the world. For your next compressor application, specify Clark Compressors—and get "Precision by the Ton."

DRESSER INDUSTRIES, INC.
OIL, GAS AND CHEMICAL EQUIPMENT
ATLANTIC BUILDING ★ DALLAS, TEXAS



Pacific Pumps, Inc., *Huntington Park, Calif.* **Centrifugal pumps, deep oilwell plunger pumps, hot oil and boiler feed pumps.**



Roots-Connersville Blower Division, *Connersville, Ind.* **Rotary positive blowers, gas pumps; centrifugal blowers, exhausters; positive displacement meters.**

Security Engineering Division, *Whittier, Calif., Dallas, Tex.* **Rock bits, reamers, casing scrapers, reamer rock bits, coring bits, Securaloy.**

Ideco Division, *Dallas, Beaumont, Tex., Torrance, Calif.* **Derricks, drawworks, rambler drilling rigs, traveling blocks, rotary tables.**

TRANS MOUNTAIN OIL PIPE LINE will soon link British Columbia and the Pacific Coast with Canada's great Alberta oil fields. The 711-mile trunk pipe line over the Canadian Rockies will bring about substantial savings in oil transportation cost. It is also an important new defense asset, relieving the Pacific Northwest of major dependence on tanker deliveries.

Canadian Bechtel Limited, acting as agent for Trans Mountain Oil Pipe Line Company, has full responsibility for design and construction of this pipeline.

BECHTEL CORPORATION

BUILDERS FOR INDUSTRY

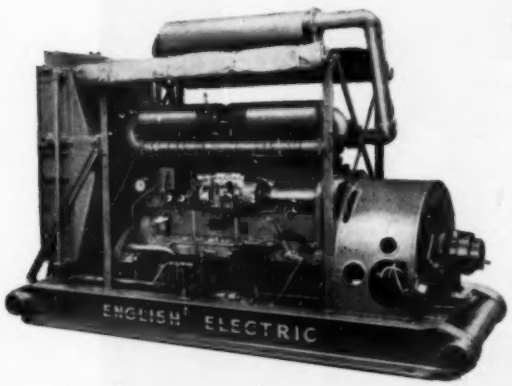
Los Angeles • **SAN FRANCISCO** • *New York*

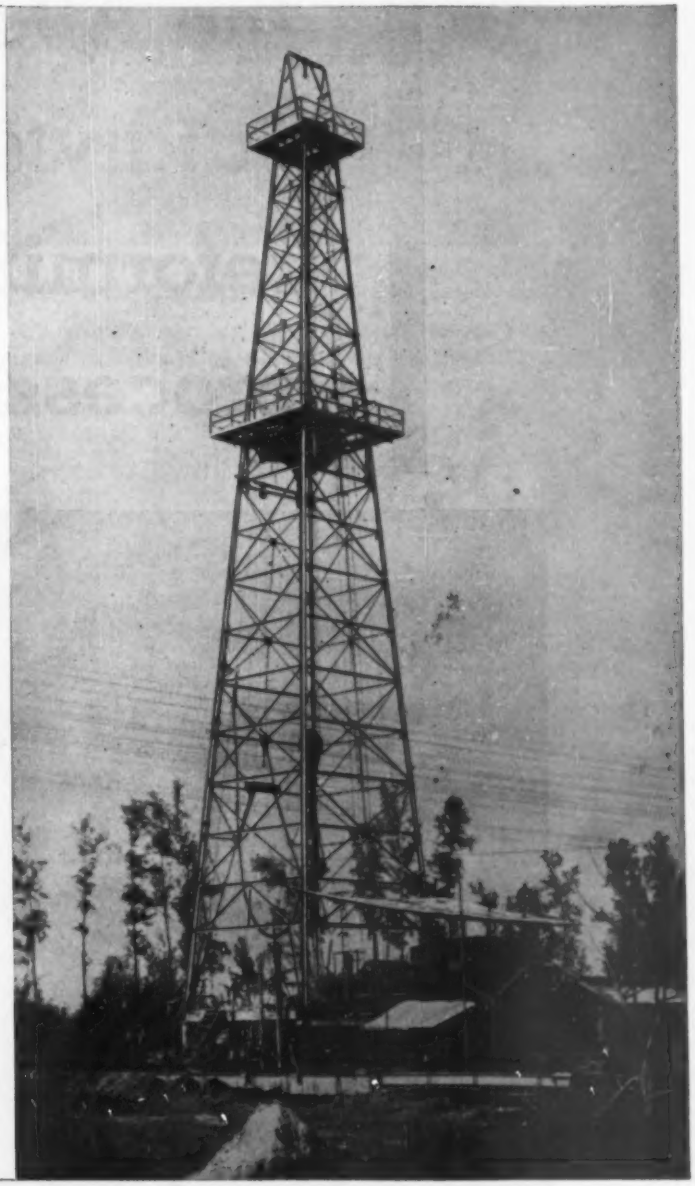
ASSOCIATE COMPANIES: *Arabian Bechtel Company*
Bechtel International Corporation • *Canadian Bechtel Limited*
Compañia Bechtel, S.A. • *Constructora Bechtel, S.A.*
Middle East Bechtel Corporation • *International Bechtel Builders, Inc.*

'ENGLISH ELECTRIC'
diesel engines

Drilling for Oil

Increase in the world demand for oil and the exploitation of new fields is leading to new drillings in many parts of the globe. This calls for rugged, reliable drilling equipment capable of operating efficiently under all conditions and in all climates. Dependable power for driving oil well drilling rigs, proved over many years of successful operation, is provided by 'ENGLISH ELECTRIC' self-contained, transportable diesel power units. The 'H' type engine of each unit develops 200 b.h.p. at 1,300 r.p.m. and is a compact, economical, quick starting and high performance engine.





The ENGLISH ELECTRIC Company Limited

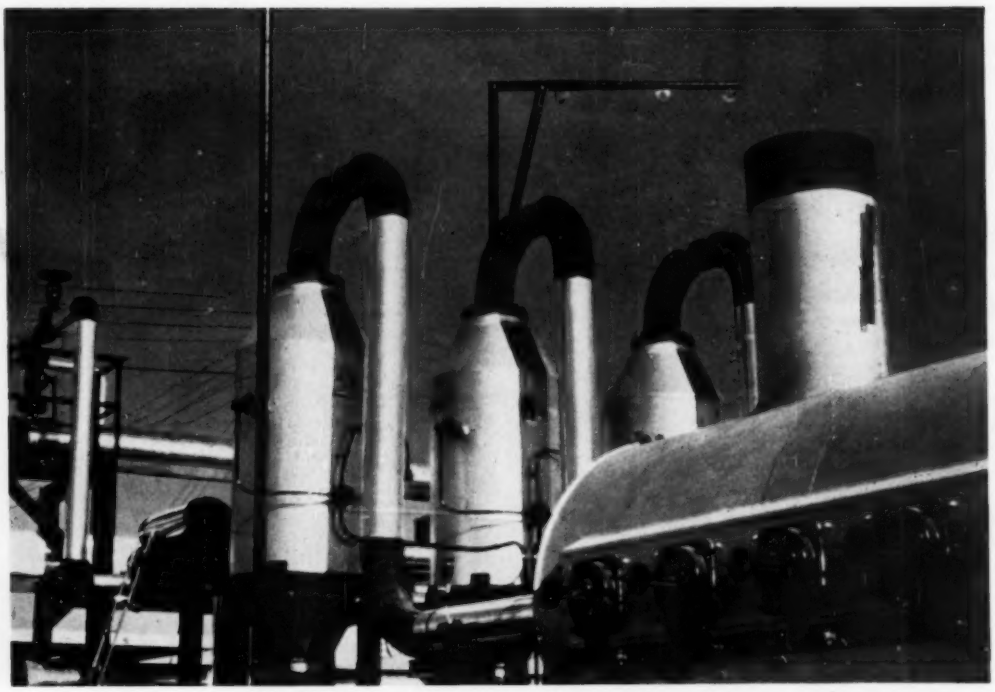
QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Diesel Engine Division, Brownsover Hall, Rugby. Telephone : Rugby 2278

Works: STAFFORD • PRESTON • RUGBY • BRADFORD • LIVERPOOL • ACCRINGTON

CATFORMING...

the Atlantic catalytic reforming process



McBride Refining's Catforming unit at La Blanca, Texas

it's the catalyst that counts

Since catalytic reforming was first utilized, numerous processes have been introduced to increase its benefits. None of these completely satisfied our requirements. So we looked for the answer in the catalyst itself.

years of research

Years of continuous laboratory study were devoted to the problem . . . in a search for a new catalyst with superior qualities. This extensive research paid off in a completely new catalyst which is the heart of Catforming. This catalyst combines improved selectivity, greater stability, excellent resistance to poisoning, and ease of regeneration.

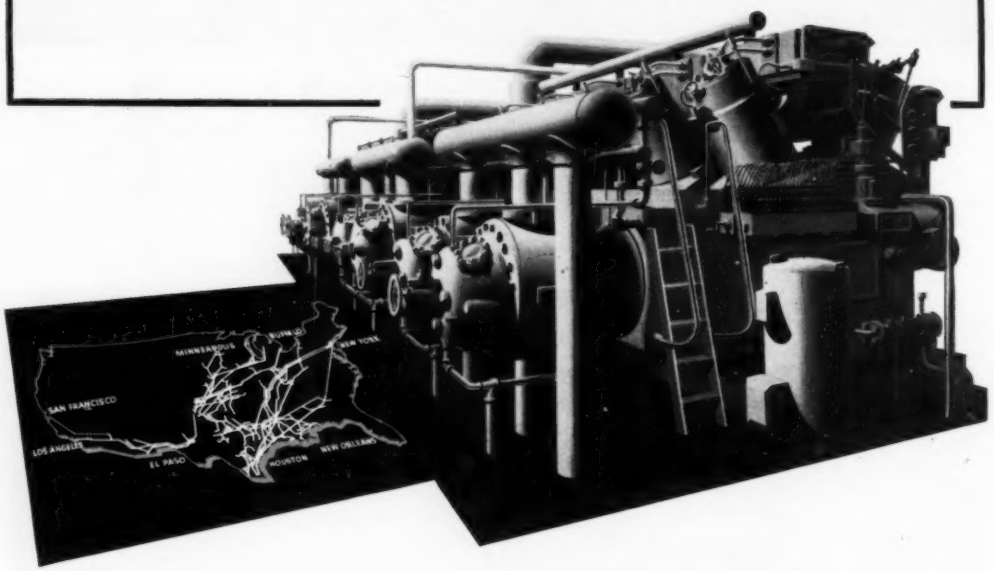
now in commercial operation

Catforming is now in successful commercial operation. It is giving exceptional results. Our engineers are ready to give you the whole story. Call or write The Atlantic Refining Company, Research and Development Dept., P. O. Box 8138, Philadelphia 1, Pa. (Telephone, HOward 5-2345).

ATLANTIC

GULF SECURITY OIL

provides better lubrication
for pipe line compressor units,
helps prevent operating troubles



Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without any appreciable change in its original properties. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings. And because oil control rings are kept clean, oil consumption is remarkably low.

Operators of the many units lubricated with Gulf Security Oil report that this quality lubricant helps them get more operating hours between overhauls, and avoid unscheduled shutdowns.

For additional information on Gulf Security Oil and for the services of a Gulf Sales Engineer, get in touch with your nearest Gulf office today. Write, wire, or phone.

Gulf Oil Corporation · Gulf Refining Company,
Pittsburgh 30, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

Uniform response to heat treatment

Another reason why you get uniform, high-quality forgings with TIMKEN® forging steels

FEWER furnace adjustments are needed when you use Timken® forging steels. You get uniform chemical composition, uniform physical properties. Result: uniform response to heat treatment—from bar to bar and heat to heat.

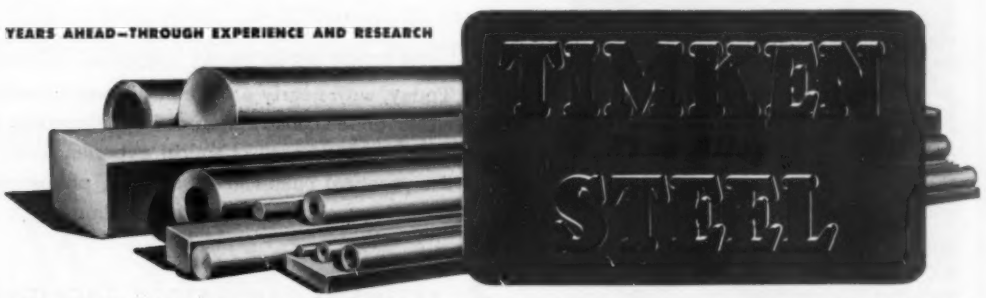
Your order for Timken forging steels is handled individually in our mills. We target conditioning procedure to your particular forging requirements. You can hold rejects to a minimum. And you save steel because the good dimensional tolerances of Timken steel forging bars produce uniform weight multiples with a minimum of steel lost in flashings.

To insure greater uniformity of chemical composition from heat to heat, the chemistry of Timken forging steel is closely controlled during melting by such modern devices as the direct-reading spectrometer. In just 40 seconds, it analyzes a test sample from the melt shop. And the melt shop gets a complete report less than 10 minutes after the sample is taken.

Forgings made from Timken forging steels have uniformly high ductility and resistance to impact. That's because Timken forging steels have uniform grain size after heat treatment—from bar to bar and heat to heat. Grain size and chip grain size of every shipment is checked under a microscope.

Let Timken forging steels help *you* turn out uniform, high-quality forgings day in, day out. For more information, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

SET UP YOUR LOW-VOLTAGE SWITCHGEAR

from 10 basic units!

Remarkable flexibility is an outstanding advantage of Westinghouse "Unitized" Low-Voltage Switchgear.

"Unitized" design lets you plan your own switchgear set-up from 10 basic units . . . equipment can be arranged to meet any requirements for generator, incoming-line and feeder control up to 600 volts.

"Unitized" design virtually eliminates special design and engineering costs. Yet it meets specific application needs dictated by the number and ratings of circuits and offers a wide selection of instruments, relays and circuit-breaker attachments.

Completely metal-enclosed and self supporting, "Unitized" switchgear can be shipped as a single unit and put in service as soon as main cable and central connections have been made. The equipment is inherently dead-front . . . modern in construction and appearance. All circuit breakers can be moved to test position or removed completely for maintenance.

Westinghouse low-voltage switchgear for indoor or outdoor installations is designed for interrupting capacities from 15,000 amperes to 100,000 amperes, in continuous ratings from 15 to 6,000 amperes, for any ratings up to 600 volts.

For installations like this, write today to address below for free booklet B-5282 to determine your switchgear needs. Westinghouse engineers are also at your service.

YOU CAN BE **SURE** ...IF IT'S

Westinghouse

WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY

40 Wall Street, New York 5, U. S. A.

FOUNDED BY RUSSELL PALMER

MONA PALMER
Publisher

E. W. MAYO
Editor

J. C. CHATFIELD
Managing Editor

W. E. ANDERSON
Production Manager

LEONARD RUBEN
Art Director

Member Of National Business Publications, Inc., and Controlled Circulation Audit, Inc.

SUBSCRIPTIONS

Annual subscription $5.00 (U.S.) postpaid
Single copies $1.00

GENERAL OFFICES

604 Fifth Avenue, New York 20
(Tel. JUdson 6-4820)

BRANCH OFFICES

LONDON
G. L. Fetherstonhaugh, St. Paul's Corner, Ludgate Hill, London E.C. 4
(Tel. CITY 5318)

LOS ANGELES 14
412 West 6th Street
(Tel. Mutual 1391)

NEW YORK 20
E. L. Townsend, Eastern Advertising Manager, 604 Fifth Avenue, New York 20
(Tel. JUdson 6-4820)

TULSA 3
O. F. Cozier, Mid-Continent Advertising Manager, 515 McBirney Bldg.
(Tel. 4-5555)

World Petroleum is published by Mona Palmer, Trustee under the will of Russell Palmer.

VOL. 23 NO. 13

DECEMBER 1952

World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

CONTENTS

31 Nation's Oil Policy Needs Revision
32 Asia-Europe Gas Line Declared Feasible
34 Washington Dateline: Election to Change Washington's Attitude Toward Oil Industry
35 S. S. P. C. Spencer Launched
36 Ordonez—New Mexican Oil Field
37 Thirteen Companies Apply for Concessions in Peru
38 Gas Industry Expands in Italy
39 New UOP Headquarters Shown to API Visitors
40 Kwinana Refinery Work Begun
42 Scale Models
44 Propose Controlled CO_2 Field Tests
49 Seven Acre Plant Studies Catalysis
50 First Year at Fawley
52 Evaporation Symposium a Feature at Chicago API Meeting
54 A New Approach
60 British Oil News
64 International News & Notes
70 Oil Company Staff Changes
78 Advertiser's Index

THIS MONTH'S COVER

A new reactor is shown in fabrication by C. F. Braun & Co. in the shadow of Shell Oil Company's fluid cat-cracker at Dominguez, Calif. The reactor, 24 feet in diameter and 92 feet high, was built of a special temperature-resistant alloy-steel. During a normal turnaround the old reactor was lifted out and replaced with its prefabricated 200-ton counterpart. The massive 240-foot guy-derrick in the right foreground handled the whole put-and-take operation. Color photograph by John Weber, staff photographer at C. F. Braun & Co.

MAGAZINE SHOW 1952

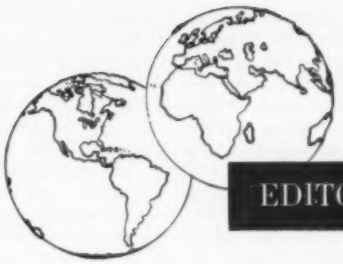
Certificate of Excellence

Awarded by The American Institute of Graphic Arts to

World Petroleum - June 1952

WORLD PETROLEUM has been selected by a jury of the American Institute of Graphic Arts for display in its third annual magazine show and awarded a certificate of excellence as publisher of an outstanding magazine. The magazine show was open to the public in New York during the last half of October and now is traveling from city to city throughout the United States and Canada. WORLD PETROLEUM is the only oil magazine selected for exhibition and one of very few industrial and business publications so honored.

GREETINGS from HALLIBURTON



EDITORIAL

NATION'S OIL POLICY NEEDS REVISION

LACK OF A CONSISTENT POLICY in relation to the international oil industry has been one, and not the least, of the factors contributing to the decline in prestige of the United States during the past few years. This is a development that has been witnessed with distress by Americans who have lived and worked abroad during that time and has caused numbers of the country's official representatives to surrender their positions in discouragement or to be forced into situations that compelled retirement.

While American enterprise had made itself felt and respected in many parts of the world long before the first World War, the nation emerged from that conflict with a new interest in international development and it commanded a degree of influence such as it had not before possessed.

This likewise was a period of extremely rapid expansion in the use of and demand for petroleum products. Nowhere was the need felt more keenly than in the United States, where the burgeoning industrial activity which was to make the next decade one of outstanding expansion was then getting under way. It was a time of great development, but also of great anxiety as to whether this country's resources could withstand the drain that was being put upon them. Concern was particularly acute as to the future of the nation's oil supply. The time, it must be remembered, was before many of the great flush fields of the Mid-Continent and Texas had been discovered and before the art of cracking had advanced to the point of multiplying the quantity of gasoline recoverable from a barrel of crude. Predictions were rife that the supply of petroleum would be exhausted in another dozen or fifteen years and some of these prophecies were sponsored by prominent geologists and economists of the day.

Fortunately for the country, the State Department of the twenties was headed by men of broad vision who believed that enterprise and ability should be encouraged to extend themselves to any part of the world for the benefit of all. Advocacy of the open door, to which the United States had been committed long before, became a definite policy and Americans were encouraged to carry their inventions, technical skills and constructive abilities into fields beyond their own borders. Particular stress was laid upon the importance of finding oil, not only for American needs, but also for the upbuilding of the producing areas.

Without detracting in the least from the many splendid achievements of other nations in the field of petroleum, it can be said that the tremendous development of the oil industry throughout the world within the past generation has been to a great extent the work of American knowhow, ingenuity, financial daring and specialized skills.

In every part of the globe where the oil industry has attained importance during this period, Americans have been in the forefront. They have carried new methods and equipment into areas almost inaccessible, have braved jungles, deserts, tropical heat and Arctic snows, have risked thousands of millions of dollars in doubtful and discouraging ventures, and in so doing have carried the oil industry to every quarter of the globe. These men have been the real pioneers of Point IV, creating flourishing communities where only barren wastes had been before, erecting schools and hospitals, installing modern comforts and raising standards of living among peoples to whom these advantages had been unknown.

The work performed in the upbuilding of the international oil industry has been of great constructive value not only to the United States, but to the whole free world. It has played a decisive part in repelling aggression and has provided the fundamental basis for repairing a shattered economy and stimulating new industrial progress in many countries. Unfortunately, the federal administration in control of the American government has not maintained consistently the helpful attitude of earlier years toward the industry.

It has not supported its nationals under unjust attacks and at times has given encouragement to such actions by its own assaults upon the industry and by attempts to discredit the men and organizations that have labored successfully to establish a record of enlightened conduct and fair dealing for America around the world. Nothing could do more to restore the nation's standing and influence than would the return to a fair and reasonable policy toward the international oil industry.

Left, S. D. Bechtel, president of Bechtel Corp., builder of world-famous pipe lines. Below, Earl English, vice president of Bechtel International, originator of the proposal for an inter-continental gas line.

ASIA-EUROPE GAS LINE DECLARED FEASIBLE

GIVING DEFINITE FORM to a study that has been under way for the past two years, the Bechtel Corporation has released a report prepared by its engineers on the feasibility of supplying Western Europe with natural gas from the Middle East. Construction of such a system, some 2,500 miles in length and extending across a good part of two continents, is a challenging subject to the engineer and the report deals wholly with physical and commercial aspects without touching upon the political considerations which obviously would be involved in such an undertaking.

The underlying purpose of the study is explained by S. D. Bechtel, president of Bechtel Corporation, in a foreword in which he says, "The rehabilitation of Europe has emphasized that area's present and future needs for a greatly increased supply of fuel to re-establish and economically expand its diversified economy on a firm foundation. To determine the practicality of such an undertaking, I asked our technical staff, which has had wide experience in super-pipelining, both in the Middle East and in other parts of the world, to develop their ideas and estimates in a brief report.

"It is my hope to distribute this preliminary report, which indicates the engineering and commercial soundness of the plan, to those who might see the far-reaching potentialities of this modern, peaceful means for balancing some of the world's resources and promoting the general welfare.

"It is recognized that there are real political obstacles, but we feel that they may be overcome because of the many benefits which can be realized by all countries."

Outlining the industrial advantages to the countries of Western Europe of a greatly enlarged supply of natural gas, the report states: "Europe is critically short of fuel. With a population more than double that of the United States and an advanced industrial development, its countries have available for use only about one third as much fuel. The major portion of their fuel supply is in the form of coal, a much less efficient and less flexible source than either oil or gas.

"The total fuel resources of Europe, available from both production and import, as reported for the year 1949, [the report was prepared in 1950] provided only 60 percent as much coal and only 8.5 percent as much crude petroleum and fuel oil as were produced in the United States. As regards natural gas, the total daily average production in Europe in 1949 was only 55 million cubic feet compared with a daily use in the United States of over 11 billion cubic feet.

"The Middle East, within economic transportation distance of all the European countries, has one of the greatest sources of low cost fuel in the world. This is the natural gas stored and produced at the oil fields in Iraq, Iran, Kuwait, and Saudi Arabia. A pipe line 2,500 miles in length would reach from the Iraq oil and gas fields to Paris. Natural gas could be delivered economically to most consuming centers in Europe by means of branch lines from this main pipe line or lines.

TABLE I

Item	UNIT COST Stage 1	TOTAL COST Stage 1	Stage 2	Combined
Pipe	$125/Ton	$106,000,000	$106,000,000	$212,000,000
Ocean Freight	$25/Ton	25,000,000	24,500,000	49,500,000
Pipe-Line Construction-includes hauling, treating, etc.	$50,000/Mile	125,000,000	95,000,000	220,000,000
Compressor Stations Complete	$5,000,000/each	75,000,000	60,000,000	135,000,000
Communications and Operating Facilities		7,500,000	3,500,000	11,000,000
Right-of-Way	$5,000/Mile	12,500,000	.....	12,500,000
Contingencies	10%	35,000,000	29,000,000	64,000,000
Engineering, Purchasing and Overhead	10%	39,000,000	32,000,000	71,000,000
		*$425,000,000	$350,000,000	$775,000,000

* Divided $250,000,000 materials and freight, and $175,000,000 construction costs.

"Preliminary studies indicate that natural gas from the Middle East could be made available at any point within the area reached by such a contemplated pipe line at a lower cost than present solid fuel prices, and at a material saving below present manufactured gas prices."

In plotting the physical features of a potential line, the authors of the report assumed that sources of supply would be Iraq, Iran, Kuwait and Saudi Arabia. To make the project specific for purposes of cost reckoning, they took Kirkuk in Iraq as a starting point and Paris as a western terminus. It was assumed that branch lines would be built to distribute fuel to industrial centers in the various countries along the line, but the report did not attempt to estimate the probable number and cost of these extensions. The preferred and probable route is indicated by the heavy line on the accompanying map with possible alternative routes shown by dotted lines.

For effective economical operation, it was calculated that two parallel lines of 500 million cubic feet daily capacity each would be required and that these could be advantageously built in two stages. With a total length of 2,500 miles for each line, it was figured that 1,800 miles should be of 34-36-inch diameter, requiring 670,000 tons of steel, and 700 miles of 24-26-inch diameter, requiring 180,000 tons of steel, or a total of 850,000 tons for each line.

The probable cost of the main line system as estimated at the time when the report was compiled is shown in the accompanying table which gives unit costs of the various elements and total costs of the two stages, amounting to a total of $775 million. It seems probable that rising costs of materials, freight and labor since 1950 might add somewhat to the investment required at the present time.

Cost of transmission of Middle East gas to Europe through the single line constituting Stage One, with an invested capital of $425 million, and to the terminus of an assumed 300 mile branch line, is calculated as 32 cents per thousand cubic feet. Of this sum, 22 cents are allotted to the operation of the main line, seven cents to transmission through the branch line and three cents to the purchase of gas in the field. On the calculation that the line could be financed by government loans bearing four percent interest and that amortization would take place over a period of 20 years, the average annual interest rate would be two percent of the total cost.

Annual operating costs of a single stage system are calculated as follows:

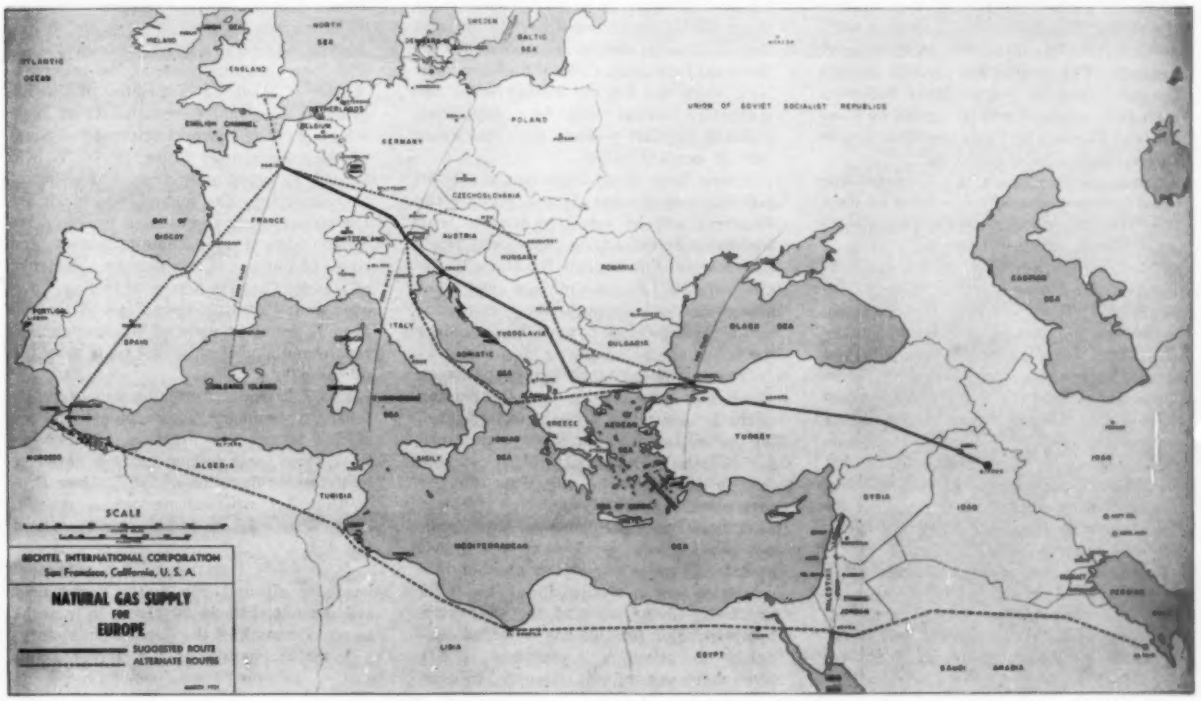
Interest, 2%	
on $425,000,000	$ 8,500,000
Amortization 5%	21,250,000
System Maintenance	1,500,000
Station fuel	
(at field cost)	500,000
Administration	750,000
Total assumed cost	$34,000,000

This represents an average main line transmission cost of 22 cents per mcf to which is added three cents for field cost of gas and seven cents for estimated cost of branch line transmission to give a total of 32 cents per thousand cubic feet at end of branch line.

As to the competitive position of long line natural gas in European markets, the report quotes 1948 sales prices of coal at various markets in Europe which figure out at an average of 88 cents per million Btu ranging from a low of 65 cents to a high of $1.75 in Italy. It also quotes rates of 42-44 cents per million Btu for bunker fuel oil and 55 cents to one dollar for industrial fuel oil. It estimates the probable cost of manufactured gas in Paris as above one dollar per million Btu as compared with a possible delivered cost of equivalent natural gas of less than 50 cents as a reason why city gas companies would gladly turn to the use of the natural product.

In indicating the size of the available market, it is pointed out that the population of countries reached by the proposed natural gas system or within economic reach by branch lines is upwards of 330 million, or more than double that of the United States which consumes daily over 11 billion cubic feet of natural gas.

Construction of the line as described in the report is held to offer no difficulties that have not been met and overcome in the building of long distance large diameter lines in the past few years. Manufacture of 34-36-inch diameter pipe is an accomplished practice in the United States and can be extended to steel plate producing countries of Europe if desired. Time required for building of the line is tentatively estimated at three years under favorable conditions.



WASHINGTON DATELINE

ELECTION TO CHANGE WASHINGTON'S ATTITUDE TOWARD OIL INDUSTRY

By Joseph Huttlinger

HOW WILL THE PETROLEUM and natural gas industry make out under a Republican administration? What about the 15-year old tidelands dispute? What about the depletion allowance, heart of the nation's drilling program? How long will price controls remain? These are some of the questions among perhaps a score in the minds of oil men today. A study of the political situation gives some strong hints of what is ahead.

It is a fairly safe prediction that a broad shift in government policy toward petroleum and natural gas is in sight with the Republican capture of the White House and of control in both the House of Representatives and the Senate. The Republicans take over the leadership in Congress on Jan. 3. They begin on Jan. 20 a reign of at least four years in the White House and executive agencies when General Dwight D. Eisenhower is inaugurated as President of the United States. He is the first Republican president in 20 years.

As for tidelands, the election result flashes a go-ahead for legislation to give the states, instead of the federal government, title to the offshore lands and the oil beneath. The matter has been in dispute for more than 15 years. Many believe a state-title measure will be passed by Congress and signed by President Eisenhower before the middle of next year.

Twice in past years the Congress has voted by heavy majorities in favor of state title, and the new Congress will have even more friends of state control.

The Truman administration's drive to discredit the industry as an alleged "international oil cartel" may be a casualty of the election returns. There are many who assert that the project for a grand jury to investigate operations of oil companies abroad and the Federal Trade Commission report was a purely political move designed to aid the Democratic presidential campaign. If so, it misfired badly and the evidence that it has harmed the nation's standing abroad as well as the oil companies may cause the whole undertaking to be sidetracked.

Attempts to abolish the 27.5 percent depletion allowed to oil producers for income tax purposes, a prime target of Secretary of the Treasury John M. Snyder and President Truman, may be dropped as an issue by the new administration. A new Secretary of the Treasury will be in office, and furthermore, the Republican platform of 1952 called for "reasonable depletion allowances," a plank adopted specifically with the 27.5 percent oil allowance in view. The probable chairman of the House tax-writing committee, Rep. Daniel Reed, R., N. Y., is a supporter of the depletion allowance for oil and gas, as is Sen. Eugene R. Millikin, R., Colo., chairman of the Senate tax-writing committee. There is little doubt that the defenders of the allowance, heart of the nation's oil and gas production effort, are in the majority in the Senate, if not in the House, and they now can point to the recent report of the Materials Policy Commission to support their position.

The drive for creation of a billion dollar commercial-scale coal-to-oil industry by government may be retarded with the departure of several synthetic fuel zealots high in administration circles. One of these is Secretary of the Interior Oscar L. Chapman. Another is Senator Joseph C. O'Mahoney, D., Wyo., defeated for reelection. Government studies of synthetic liquid fuels will go on, against the day the process becomes commercially practicable, but more weight will be given the National Petroleum Council findings. The NPC says the day is distant when the synthetic process will be competitive, pointing out that gasoline from coal would cost 42 cents a gallon.

A new look at oil imports and oil import taxes is in store, if only because the Congress will be asked to wrestle with legislation to extend the Reciprocal Trade Agreements Act beyond its June 30 expiration date. Various oil, coal, and other groups are out to curb the administration's tariff-cutting powers in extending the act.

The government's price control program, which sees domestic producers champing at the bit for relief, appears to be headed for the scrap heap, but it may take until April 30, the scheduled expiration date, for this to come about. On June 30 the government's authority to ration steel and other basic material comes to an end unless the Defense Production Act is extended. There is a question whether this legislation will be scrapped, but it may be modified. If the voice of the Petroleum Administration for Defense is heeded, materials allocations will continue. PAD says shortages of oil country tubular goods will call for materials controls at least through next year.

The Kerr Natural Gas Bill to free some natural gas sales by producers from government price controls may be revived, although there is a question whether it could be enacted into law even now. The same end might be accomplished by revising the makeup of the Federal Power Commission. At present the term of Thomas Buchanan of Pennsylvania is drawing to a close, and General Eisenhower is expected to appoint a person more friendly toward natural gas. Others on the FPC are eager to resign.

The Senate Commerce Committee passes on all nominations to the commission. Senator Charles W. Tobey, R., N. H., who is more in sympathy with natural gas consumers than producers, will be chairman of the committee. In the past, he voted for such new deal-minded persons as Leland Olds and John Carson for membership on the Federal Trade Commission.

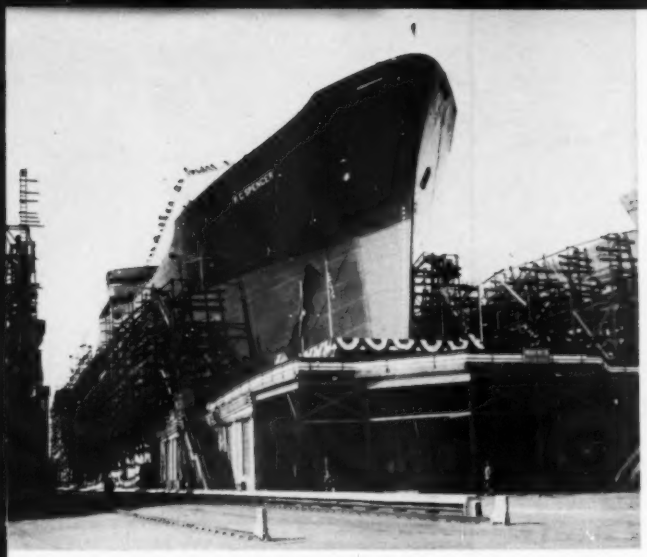
The National Petroleum Council, composed of 101 of the nation's top oil and natural gas executives, is all but certain to continue in business under the Republican regime. There are signs, further, that it may find more official cooperation. The long-time chairman of the council is Walter S. Hallanan, a member of the Republican National Committee from West Virginia. The sharpest critic of the council, Rep. Emmanuel Celler, D., N. Y., will be able to speak only from a position of the minority. The council, which advises the government, was created by executive order of the outgoing administration, and could be put out of business by the stroke of a pen. There is a general feeling, however, that President-elect Eisenhower will keep it going in view of its constructive record and almost universal support by the oil industry.

The Petroleum Administration for Defense, a temporary government agency staffed largely by practical oil men on leave from their companies, will go on at least for the duration of the Defense Production Act which runs until June 30, 1953. The Congress is expected to extend the Act.

A complete turnover of top personnel handling oil and gas matters, the first 100 percent shift in 20 years, is in sight as an aftermath of the Republican victory.

A major change, as far as petroleum

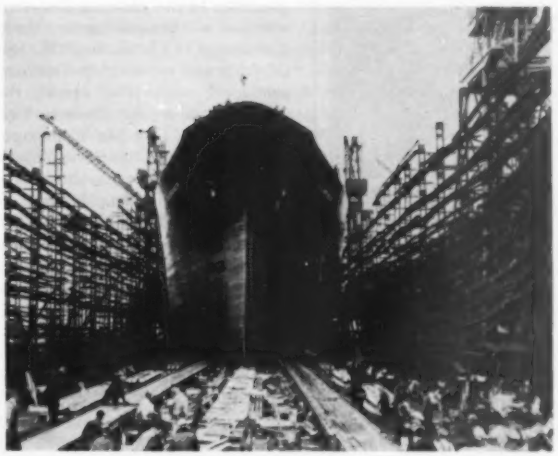
(Please turn to page 74)



The tanker "P. C. Spencer" ready for launching.

S. S. P. C. SPENCER LAUNCHED

Mrs. P. C. Spencer, wife of Sinclair's president, sponsored the new addition to the company's fleet.



IN a procedure unique in peace-time shipbuilding, the keel was laid for a duplicate tanker Nov. 7 on the same way from which minutes previously a similar vessel had been launched at Bethlehem Steel Company's Sparrows Point, Maryland, shipyard. Both tankers are for the Sinclair Oil Corp. The newly-christened ship was the *P. C. Spencer*, named for Sinclair's president and sponsored by his wife. The second ship will be named the *M. L. Gosney*, after the Sinclair executive vice president. The Sinclair ships, of 25,000 dwt, will be the largest in the corporation's fleet.

The *P. C. Spencer* will bring to 11 the number of ocean-going Sinclair tankers now in service. The company also operates a number of chartered ocean tankers and has one of its own tankers on the Great Lakes.

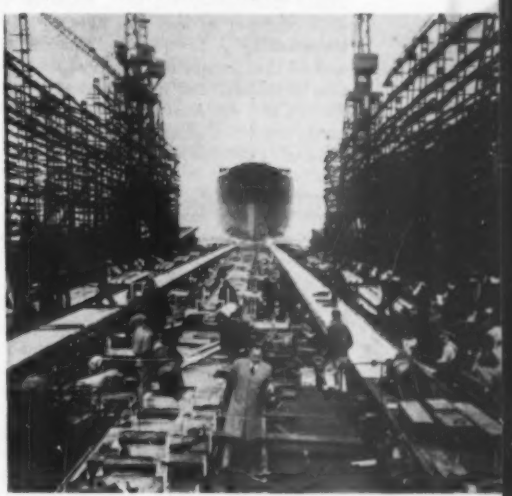
The new ship is 604 feet, 7 inches long overall, with a 78-foot beam and a 44-foot, 2-inch depth.

The main propulsion unit is a high pressure steam geared turbine capable of developing 13,750 shp. Singlescrew driven with a 5-bladed propeller, the ship is designed to have a speed of 18 knots. Navigational aids include radar, fathometer, gyro-pilot, direction finder, radio telephone, and a complete gyrocompass.

All welded construction was used throughout the vessel, with the exception of riveting on some specific longitudinal seams. There are two continuous bulkheads and eight transverse bulkheads dividing the cargo carrying space into 27 tanks. In addition, 63,300 cubic feet of dry cargo carrying space is provided. The bulk cargo can be discharged in approximately 14 hours.

The keel for the *P. C. Spencer* was laid on March 17 of this year, and the ship will be delivered in January. Present plans call for the ship to be used in coastwise and Caribbean service, primarily as a crude oil carrier.

Within minutes after the "P. C. Spencer" was in the water, Bethlehem shipbuilders laid the keel of a second new Sinclair super-tanker.



ORDONEZ—newest Mexican oil field

By Ing. Valentin R. Garfias

Ing. Valentin R. Garfias, Mexican by birth and a graduate of the Military College, obtained degrees in civil and mechanical engineering and geology at Stanford University in California. He worked in California oil fields and returned to Stanford as professor of petroleum engineering there. While in California, Ing. . Garfias made studies for numerous oil companies, including the Huasteca, then the most important in Mexico. He subsequently went to New York as head of foreign activities of Cities Service and was later a director. During the more than 30 years that Ing. Garfias has managed the affairs of Cities Service in Mexico, the relationship between the company and the Mexican government has been harmonious with amicable handling of all problems, including those originating with the oil expropriation. Ing. Garfias is an honorary consultant of Petroleos Mexicanos.

THE DISCOVERY of the Ebano field in 1903 brought Mexican petroleum production for that year to 75,000 barrels, but it was not until 1908 that the importance of the Mexican oil industry was established with the bringing in, on July 3, of the famous Dos Bocas well, the first of the great Mexican gushers.

This well literally exploded oil and gas under tremendous pressure, shooting the drill pipe out of the well like an arrow propelled by a 1,000-foot column of gas and oil that immediately caught fire from nearby boilers. Dos Bocas burned for two months and was finally drowned by an immense cone of mud and water, after an estimated 1,000,000 cubic yards of earth had been blown into the air. Dos Bocas formed a "lake" that has since been emptying into the Tamiahua Lagoon where a dark "beach" of oily shale and limestone extends far off shore.

Following the spectacular Dos Bocas "volcano," intensive drilling was carried on to the southwest along a line of oil seepages and three fabulous wells came in: Casiano No. 7, which produced 71,000,000 barrels; Cerro Azul No. 4, which produced 88,000,000 barrels and is still flowing about 13 barrels daily; and Potrero del Llano No. 4, which broke all records with a total production of 94,000,000 barrels. These 250,000,000 barrels, added to the production of the other fields, brings to 1,150,000,000 barrels the total production of the Golden Lane to date.

In these three one-well fields and the other commercially productive areas of the Golden Lane, all located on crestal highs along a narrow faulted cretaceous reef, the oil was driven to the surface under tremendous hydraulic pressure.

The Mexican fields reached their peak and those in the Golden Lane started to "go to water" in 1921, the production that year being 193,000,000 barrels, with the Golden Lane contributing the bulk of this total.

Production declined rapidly until after Poza Rica (which is not in the Golden Lane) was discovered in 1930. This field has produced 500,000,000 barrels of 30° API oil, its present flow being close to 140,000 barrels daily for a total of about 50,000,000 barrels yearly.

Intensive exploratory drilling has been carried on for many years not only between the old Golden Lane fields, but along the northern and southern trends of this structure, in a vain effort to find extensions, but it was not until August of this year that these explorations were rewarded with a discovery, the Ordonez field.

Arroyo Grande No. 1 started drilling in 1949. This well, located 17 miles northeast of Poza Rica and nine miles from the Gulf of Mexico, encountered salt water at 6,100 feet below sea level. Then Arroyo Grande No. 2 was drilled two miles northwest of No. 1, and reached salt water at 5,250 feet. Poza Verde No. 1 was next drilled 1½ miles northwest of Arroyo Grande No. 2 and also went to salt water 5,000 feet below sea level. Ordonez No. 1 was then drilled 5,900 feet southwest of the Poza Verde well and in July of this year encountered a heavy gas flow at 4,590 feet. Ordonez No. 2, located 1,640 feet northwest of No. 1, found gas and oil at 4,700 feet, and the third well, 1,150 feet southwest of No. 1, reached the oil bearing El Abra limestone at 4,600 feet. On August 30, Ordonez Nos. 2 and 3 were carefully tested, the writer being present, and the production of each was conservatively estimated at 5,000 barrels daily of typical Golden Lane crude, with bottom hole pressures of close to 2,470 pounds losing only 15 pounds during the test.

Ordonez No. 4 is now drilling about 3,300 feet due east of the discovery, and

By Juan E. Rassmuss

Thirteen companies apply for concessions in Peru

Ordonez Nos. 5 and 6 will soon be drilling as one quarter of a mile step outs to the south and east. As it takes less than 30 days to drill these wells, it is reasonable to expect that by the beginning of next year enough wells will be drilled for the Ordonez field to produce in the neighborhood of 50,000 barrels daily. This will be available to domestic and foreign markets, as a 10-inch line is now being built to Poza Rica, which is already connected by pipe line to Mexico City and the seaboard.

But the discovery of Ordonez tells only part of the story, because 25 miles northwest of this field, at Horcon, a 1,000-barrel well has just come in extending the Golden Lane from San Isidro seven miles to the south and opening the way, as shown by geological and geophysical investigations, for finding productive structural highs not only between San Isidro and Horcon and Horcon and Ordonez, but between this field and the Gulf of Mexico. It is reasonable to conclude, therefore, that the Ordonez and Horcon fields indicate that the *original* Golden Lane structure, about 50 miles in length from Dos Bocas to San Isidro, may well extend another 50 miles between San Isidro and the Gulf of Mexico.

It should be kept in mind that although in the San Isidro-Ordonez extension of the Golden Lane no Casiano, Cerro Azul or Potrero wells are to be expected, it is not improbable that these additional 50 miles of Golden Lane may produce, if not the 1,150,000,000 barrels of the old Golden Lane, perhaps the 500,000,000 barrels that Poza Rica has produced to date, or at least several hundred million barrels of oil.

Finally, these two additional probabilities must be considered: (1) that the Golden Lane may extend not only beyond Ordonez to the Gulf of Mexico, but into the Gulf; (2) that the Golden Lane may also extend from Dos Bocas northeast across the Tamiahua Lagoon and into the Gulf.

Taking all the foregoing into consideration, it is evident that the discovery of the Ordonez field in August of this year is the most important happening in the Mexican oil industry since the discovery of Poza Rica 22 years ago.

ON OCTOBER 28, according to the new petroleum law, the Peruvian Government reserves were cancelled and the country opened to private enterprise. Thirteen oil companies presented, simultaneously, 252 applications for a total of 3,774,000 hectares or about 9.3 million acres. The Peruvian Minister of Fomento, Ing. Miranda Sousa, and U. S. Ambassador Tittman were present at the opening audience. Twenty three million soles (about 1.5 million dollars) had been deposited beforehand as guarantees for the applications. The number of applications for direct exploitation concessions was surprisingly high, covering about 1.2 million acres, considering that no drilling has been done so far in the area. Besides, the taxes on these concessions are considerably higher and amount to about $3 U.S. per hectare for the first year. The reason is that they enjoy preference over the exploration concessions in the overlapping areas. A considerable number of the exploitation concessions also are overlapping and definite titles will be granted only by auction of the overlapping concessions to the highest bidder. The staff of the official Petroleum Department is working in four shifts around the clock to inscribe the concessions and delimitate them on the maps.

Among the foreign companies, International Petroleum Co., Ltd. applied for the maximum of 400,000 hectares, or about one million acres, in the Sechura district, including also the maximum of direct exploitation concessions of 250,000 acres. Gulf Oil Corp. covered about the same extension of exploration concessions.

Conorada Petroleum Corp. applied for about 865,000 acres including 123,500 acres of direct exploitation concessions.

Richmond Oil Co. asked for the maximum of one million acres, including also the maximum of exploitation concessions.

Seaoil Ltd., belonging to the Canadian holding group of Ventures Ltd., applied for almost one million acres, including the maximum 250,000 acres for exploitation.

Peruvian Oil and Minerals Ltd., another Canadian group, applied for about 72,000 acres in Sechura.

Peruvian Oil Concessions, constituted of American and Argentine capitals, applied for about 97,000 acres.

Compania Sudamericana de Petroleo, formed by Argentine capital, applied for about 130,000 acres of direct exploitation concessions.

The national Petrolera Peruana S.A. asked for more exploration concessions in addition to its prior application, and the national Cia. Peruana de Petroleo El Oriente applied for exploration concessions also in the coastal area.

The Peruvian banking and commercial firm of Messrs. Wiese asked for new acreage for exploration.

The Peruvian mining company Consorcio Minero took a concession of 25,000 acres in the region of Nazca south of Ica, where no oil prospects are known.

Principal interest was concentrated in the coastal area. In the Montana, the Peruvian Amazon basin, where geological surveys have been conducted by International Petroleum, Shell, and Socony Vacuum, the big companies have not yet applied for concessions because of the heavy necessary investments. The national El Oriente company, which has already drilled two exploration wells in that region, has applied for 1.7 million acres of new concessions for exploration.

Ganso Azul Co. has applied for about 250,000 acres of new concessions, located in different areas.

The Canadian company, Peruvian Oil and Minerals Ltd., has taken about 900,000 acres for exploration and about 100,000 acres for direct exploitation in the Peruvian Amazon basin.

The coastal area has been covered almost completely by the new concessions and the number of new oil companies is exceeded in South America only by Venezuela. Considering the relatively short term of three to five years of the exploration concessions and the large number of direct exploitation concessions, a strong activity, comparable to Canada, and a fast development can be expected, and Peru may seek the second place in South America after Venezuela.

As in Canada, the legal provisions permitting the development of a free competitive private industry will stimulate activity in the oil industry in Peru. Unlike Venezuela, but similar to the situation in Canada, national companies have also taken their share in the industry.

Gas industry expands in Italy

By Prof. Saverio Ilardi

SINCE 1939, geologic and seismic exploration have led to the conclusion that the whole Po Valley in Italy should be considered to comprise a large succession of petroleum reservoirs.

In 1946 there was discovered the Caviaga field, in 1948 the Ripalta, in 1949 the Cortemaggiore, and in 1950 the Cornegliano Laudense fields. New fields are being drilled, with encouraging results. At Cortemaggiore a special 16,000-foot rig is drilling to determine the possible existence of deep-lying horizons. Areawise, the explorations of the Azienda Generale Italiana Petroli (AGIP) in 1949 covered 6,400 square kilometers; in 1950, 19,750 square kilometers; and in 1951, 19,780 square kilometers. In the biennium 1945-6, ten wells were drilled in the Po Valley; in 1947-8, 15 wells; in 1949-50, 53 wells; and in the single year 1951, 78 wells. The total footage drilled up to the first months of 1942 amounted to 715,000 feet. Out of this activity, there resulted 150 producing wells and 22 dry holes. The personnel employed by AGIP rose from 1,050 in 1949 to 1,704 in 1950 and to 2,420 in 1951.

The fields now being worked are Podenzano, Caviaga, Cortemaggiore, Pontenure, Turro, Cornegliano, Bordolano, Ripalta, Correggio, and Rapagnano, which, in sum, are able to produce 423.6 million cubic feet of natural gas per day, with a reserve sufficient to last for 20 years. This is equivalent to an annual production of 6.5 million tons of coal a year.

After completion of the geophysical exploration of the Po Valley which revealed the structural situations considered the most susceptible to exploitation, the AGIP extended its activity to other zones of the peninsula. Geological and geophysical surveys were made in Marche, Valle Latina, Puglia, Basilicata and in Bradanica, followed by the drilling of numerous exploratory holes.

This activity of the AGIP resulted in raising Italian production of natural gas from 706.2 to 812 million cubic feet per year before the world war, up to the present output of 52.65 billion cubic feet. Now that private operators are increasing their activities it is possible to foresee within a short time a total production of 450 million cubic feet of natural gas per day amounting to about 170 billion cubic feet a year.

In view of this increase of natural gas resources, the AGIP is striving to realize a program of pipe line construction that will make these resources available to consumers. The first aim of this development program has been to connect the gas fields with nearby centers where important industries are located, using pipe lines of medium diameter. At present the natural gas lines transporting gas from the AGIP fields have a total capacity of 10 million cubic feet per day and a total length of about 1,400 kilometers, making connection with the cities of Turin, Milan, Pavia, Novara, Varese, Bergamo, Lecco, Cremona, Brescia, Parma, Reggio Emilia and numerous points of lesser importance industrially in Lombardy, Emilia and Piemonte. This system is being continually extended and when works now in progress are completed, the system will carry 700 million cubic feet of gas a day and will have a length of 4,500 kilometers including branches and service lines. Also included in the program are three large trunk pipelines to carry gas to Venice, Bologna, Genoa and further on to Mantua, Verona, Vicenza, Padua, Treviso, Modena, and branch lines to minor centers in Vercelli, Biellese, Canavese, Alessandria, Acqui, Savona, Valtellina, Trentino and Ferrarese.

Natural gas is now finding numerous uses in Italy. The industrial sector is absorbing more than 80 percent of the output, the rest going to automotive traction, domestic use, and for heating. In the industrial field the major use (25 percent) is in the steel industry, next is in the textile industry (15 percent) for steam production, and in the chemical industry (15 percent) where it is used as a raw material for chemical synthesis. The glass and ceramic industries take 6 percent, the food industry 3.6 percent, the machine industry 3.3 percent and the construction industry 2.3 percent. Even the electrical industry uses natural gas in secondary installations which operate from November to March. Lately a large new electricity center of the Societa Edison in Piacenza and one of the S.T.E.I. in Tavazzano will produce about a billion kwh a year, consuming about 1,230 million cubic feet of gas a year. In 1951 there were used about 4,200 million cubic feet of gas compressed in portable drums for civilian use in substitution for coal.

In view of the present price of coal, the use of gas results in an economy of 40 to 50 percent, or 10 to 30 percent over the cost of fuel oil.

Besides natural gas, the Cortemaggiore wells are producing about 300 tons of crude oil a day, with some prospects of increase. Some horizons in the Contemaggiore field have been found to contain condensate, carrying high percentages of propane and butane. The crude oil contains 80 percent of light fractions boiling in the gasoline range and 20 percent of kerosine and a higher boiling residue.

There is a natural gasoline plant at Cortemaggiore with a capacity for treating three million cubic feet of gas per day by the oil absorption process. The products obtained include 150 tons of 77 octane stabilized gasoline, 120 tons of propane-butane, 20 tons of 45 octane light oil, 20 tons of heavy residue, and 100 million cubic feet of dry gas consisting almost entirely of methane and a little ethane, with a heat value of 1,000 Btu per cubic foot. All these products are practically free of sulfur. Before entering the pipeline system, the gas is dehydrated by the glycol process.

Italian production of kerosine, gasoline and natural gas is shown in the accompanying table.

The progress made by the AGIP indicates that within a short time, Italy will have an important source of energy which should greatly raise the level of its industrial production.

PRODUCTION OF KEROSINE, GASOLINE AND NATURAL GAS IN ITALY

Year	Kerosine & Gasoline 000 Kg	Natural Gas 000 Cubic Ft.
1946	2,675	442,000
1947	2,973	725,000
1948	2,511	987,000
1949	3,630	8,776,000
1950	5,078	10,730,000
1951	16,913	25,335,000
1952 (Estimated)	120,000	52,650,000

Part of the drafting department.

NEW UOP HEADQUARTERS SHOWN TO API VISITORS

UNIVERSAL OIL PRODUCTS COMPANY was host to many visitors, during the recent annual meeting of the American Petroleum Institute, at its new general offices which have been moved from Chicago to Des Plaines, Ill.

A 54-acre tract at 30 East Algonquin Road, some 25 miles from the Chicago Loop, was purchased as a site for the building by UOP so that there will be space for the future erection of research facilities. Plans are that the Riverside laboratories will be discontinued at some future date and research work centered at Des Plaines.

The new UOP office building consists of a modern two-story and basement structure designed for maximum flexibility to fit future changing needs of the organization. Partitions, except in the administrative offices, are of the movable type which allow for ready changes in the size of offices and conference rooms. At present the building houses an administrative, engineering and sales staff of some 400 persons.

One section of the building is occupied by Procon, Inc., a subsidiary of UOP engaged in refinery construction. Procon has separate reception and office facilities, the entrance being on Prospect Road.

Administrative offices of David W. Harris and his staff are furnished with the antique furniture collected over many years by the late Hiram Halle, former president of UOP during the period when the famous Dubbs cracking process was being developed. Walls as well as ceiling are of sound-absorbent materials. A center of interest in the Directors' room is the circular table of variable diameter which once was used by the Rothschilds of England in their banking establishment.

The reception room is finished in marble and travertine stone. A photographic mural of the Chicago skyline occupies one wall.

The building is constructed of reinforced concrete and steel with a facing of stone and buff face brick. It is 360 feet in length and 75 feet wide with aluminum window frames and thermopane glass. All offices, hallways and large-group working areas are fluorescent lighted to provide non-glare illumination of sufficient intensity for eye comfort. The offices are completely air conditioned for maximum comfort during all seasons of the year, and the air conditioning system circulates 66,240 cubic feet of tempered and filtered air per minute. Fresh air intakes are located in two penthouses on the roof.

Cafeteria facilities have been provided in the basement of the building with equipment installed to prepare meals for 700 persons. The dining area accommodates 300 at a time. The cafeteria can also be used as a refuge area in the event of air raids. The floor immediately above was especially designed and constructed to provide maximum protection and windows were eliminated in the area.

The extreme east end of the basement houses the blueprint department and the building's heating and auxiliary equipment, while storage space is provided at the west end.

Located on the first floor are the engineering, purchasing, commercial development, service, engineering research and development, and personnel departments. On the second floor are the administrative offices, as well as those of the legal, patent, literature research, products, public relations, accounting and drafting departments.

Exterior view of new UOP building at Des Plaines, Illinois.

Entrance lobby of new UOP building.

H. J. W. Braddick, London project superintendent for the Kwinana refinery project.

C. H. E. Rebbeck, resident engineer for the construction of the Australian refinery.

D. W. K. Barker, manager of Anglo-Iranian's Australian division, refineries department.

A. E. Mason, general manager of the project and liaison with the government.

KWINANA REFINERY WORK BEGUN

On October 1 work began on the site of the Anglo-Iranian Oil Company's new Kwinana refinery, 12 miles from Fremantle, Western Australia. Planned to be completed by the end of 1955, the £A40 million refinery will have a capacity of three million tons of crude oil per year and is expected to supply about 40 percent of Australia's then estimated annual requirements. It will be the largest refinery in Australia.

Since the standstill at Anglo-Iranian's Abadan refinery last year, the company has been obliged to obtain oil products from the Western Hemisphere for shipment to Australia to satisfy the demand. A refinery at Laverton, near Melbourne, operated by Commonwealth Oil Refineries Ltd., (a joint enterprise of Anglo-Iranian and the Australian Federal Government until the latter disposed of its shareholding to the former in September of this year) has supplied a small part of the country's requirements, but its capacity is only 120,000 tons a year. With transport from the Western Hemisphere uneconomical, besides involving the expenditure of dollars, the company decided to build a refinery in Australia.

The geographic position of Western Australia influenced the choice of site. Large tankers will carry crude oil from the Middle East and smaller tankers will take the refined products to the eastern Australian ports and New Zealand.

With the assistance of the Western Australian authorities, the Kwinana site was eventually chosen by Anglo-Iranian's experts sent from England. Situated on Cockburn Sound, about 12 miles south of Fremantle, one of Australia's main bunkering ports, it can easily be connected by rail and pipeline with both Perth and Fremantle. The existing road connections are excellent.

About 900 acres of comparatively level land covered with light scrub, well above sea level, with good load bearing properties, offered an ideal site for industry. Alongside is sheltered deep water where the biggest tankers will be able to maneuver and dock at any state of the tide.

The project consists of three major elements:

(1) The refinery and its ancillary services, with a capacity for processing three million tons of crude oil a year.

(2) The port, capable of importing three million tons of crude oil a year and exporting from the refinery the proportion of finished products to be dispatched by tanker.

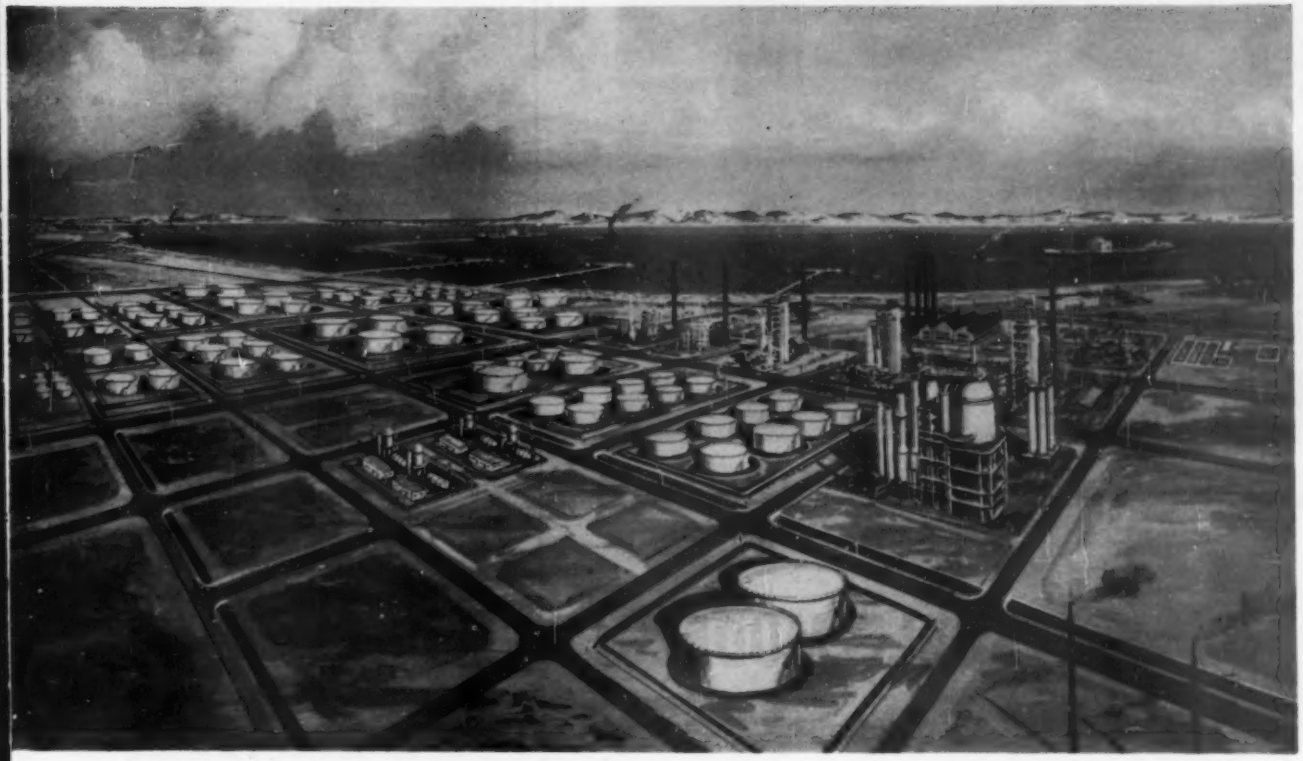
(3) A complete township which will include houses for the company's employees together with amenities, shops, ancillary industries and all normal municipal facilities. This will be a state government responsibility.

Main contractors will be the M. W. Kellogg Co. and its British registered subsidiary, Kellogg International Corp., in association with a consortium of British contractors headed by Costain-John Brown.

Five main units, all of the latest design, will comprise the refinery plant. Key items will be two atmospheric distillation units complete with stabilisers, solutisers and soda washers. There will also be a vacuum distillation unit, a catalytic cracking unit and a Platforming unit, a Hydrofining unit and the necessary number of small treatment units for sweetening and final treatment of the products.

From the input of three million tons of crude oil, the refinery will produce about 2.77 million tons of refined products annually, comprising in its early stages at least, the main products needed for the Australasian market.

Fuel oil will comprise the largest bulk product, 1.55 million tons being produced annually. Other principal products will be 660,000 tons of motor spirit, 240,000



Artist's impression of the proposed Kwinana refinery to be built at Cockburn Sound near Fremantle, Australia.

tons of diesel oil, 200,000 tons of gas oil, and 60,000 tons each of aviation turbine fuel and tractor vaporizing oil.

Cooling water for the processes will be taken from the sea, about 2.5 million gallons per hour being needed. After circulation this water will be discharged back into Cockburn Sound, maximum precautions being taken to ensure that no oil is allowed to escape into the sea. An additional three million gallons a day of fresh water for use in the refinery and for domestic purposes will be drawn from municipal sources, the Metropolitan Water Supply Department having the provision of this in hand.

Steam for the refinery will be generated in four water tube boilers, the capacity of each being 75,000 pounds per hour. More than 60 tanks will be built in the tank farm adjacent to the refinery.

Nearly a quarter of the estimated cost of £A40 million will be represented by wages to be paid in Australia. During the construction period, the total labor force is expected to be about 1,000 at the end of six months, rising to a peak of about 3,000 men 12 months later, and then falling away to a permanent establishment of approximately 1,200.

A conservative estimate of materials required for the construction work is: steel, 55,000 tons; cast iron pipes and fittings, 7,000 tons; cement, 20,000 tons.

Jetties capable of accommodating simultaneously three of the 32,000 dwt tankers now being built for the British Tanker Co., Anglo-Iranian's shipping organization, are to be constructed.

The state authorities have accepted a tender for dredging an approach channel to the sound through the Success and Parmelia sandbanks. Well over seven million cubic yards of sand will be removed in dredging the channel to a depth of 38 feet and a width of 500 feet.

Main offices and the administrative center will be near the shore. Bath house facilities and canteen are to be located nearby, together with time and wages offices, first-aid and medical center, fire station and other facilities. Included in the administrative area will be the general office building, the marine offices and the central laboratory.

The Western Australian State Housing Commission is developing a township some two and a half miles from the refinery, and this will include accommodation for the refinery employees. Tenders are to be invited in November for the erection of 330 houses as a first installment of some 1,000 to be built within three years.

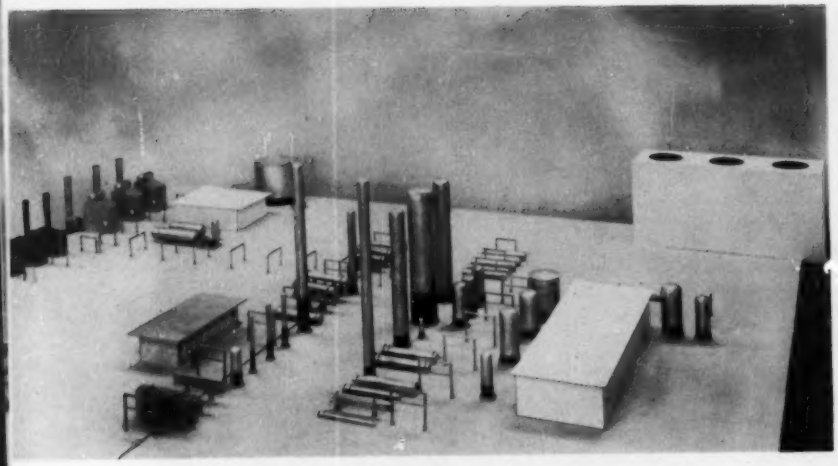
A. E. Mason, who has been in Perth for some months, is the general manager of the company's operations in Western Australia.

C. H. E. Rebbeck has been appointed resident engineer to take charge of construction of the new refinery. He arrived at the site on October 13. For the past three and a half years, Mr. Rebbeck has been resident engineer of the company's expansion program at the Grangemouth refinery.

As head of Anglo-Iranian's Australian division, refineries department, D. W. K. Barker is responsible for superintending the planning, construction and subsequent commissioning of the refinery from the London head office of the company.

He is assisted by H. J. W. Braddick, project superintendent in the London office. Messrs. Barker and Braddick have both visited the site of the new refinery.

Products from the refinery will be distributed throughout Australia by Commonwealth Oil Refineries Ltd., for which a big expansion program is planned. Bunkering is handled by BP (Australia) Ltd. The British Petroleum Co. of New Zealand will also draw supplies from Kwinana.



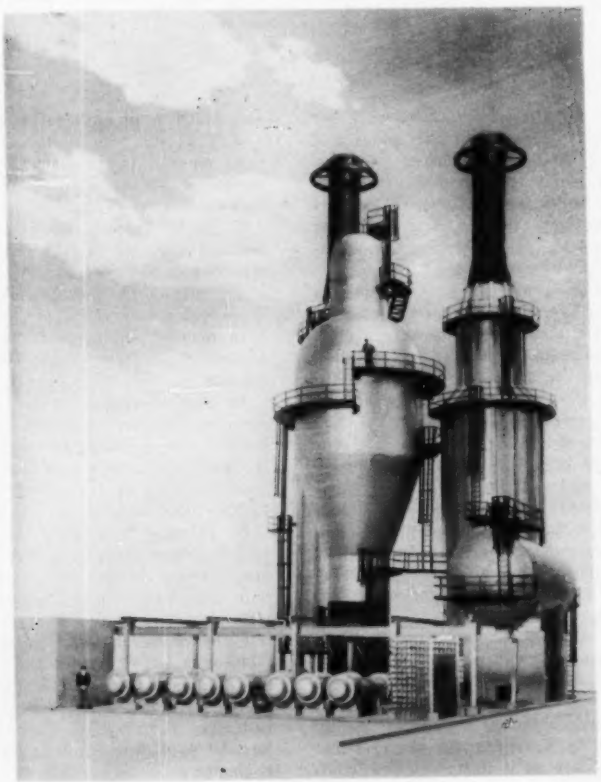
Working tools for the designer, construction engineer, plant operator and safety supervisor.

Fig. 1. Preliminary model with detail absent.

SCALE MODELS

By Harold L. Sebelin*

Fig. 2. Structural model with ladders and platforms added.



A PART TIME EXPERIMENT in the Kansas City branch office of The Fluor Corporation Ltd., by Robert L. Merrick has grown into a full-scale project with the company. Mr. Merrick, who is now vice president in charge of engineering for Fluor, began assembling scale models as an aid in plant design. At the Kansas City office he was assisted by Fluor's draftsmen in building the first models.

As the making of models progressed, their value as a working tool became more and more apparent. Reaction was so strong in favor of the model as a money and time saver that Fluor established a completely equipped model shop, staffed by professional model makers. Intricate scale models of power plants, refineries, and industrial installations are now completed at the average rate of one a week. Every phase of design, construction, operation and maintenance has profited by the use of these scale models.

Each model is built to an exact scale of one-quarter inch to one foot, thus enabling the model makers to stockpile various parts, such as heat exchangers, pumps, valves, etc. As in all model-making, the materials used reflect the ingenuity of the model-maker. Columns and horizontal vessels are made from cardboard tubing and wood. Ordinary galvanized fly screening is used to represent grating. "Steel" structural members are made from wood. Valves, pumps, and other small parts of machinery replicas are cast. Lucite and other materials are used for the piping.

Fluor's models are divided into three classes:

A. Preliminary model, which has only equipment on it and concentrates on general plant arrangement. (Fig. 1).

* Chief Draftsman-Layouts, General Engineering Division, The Fluor Corporation.

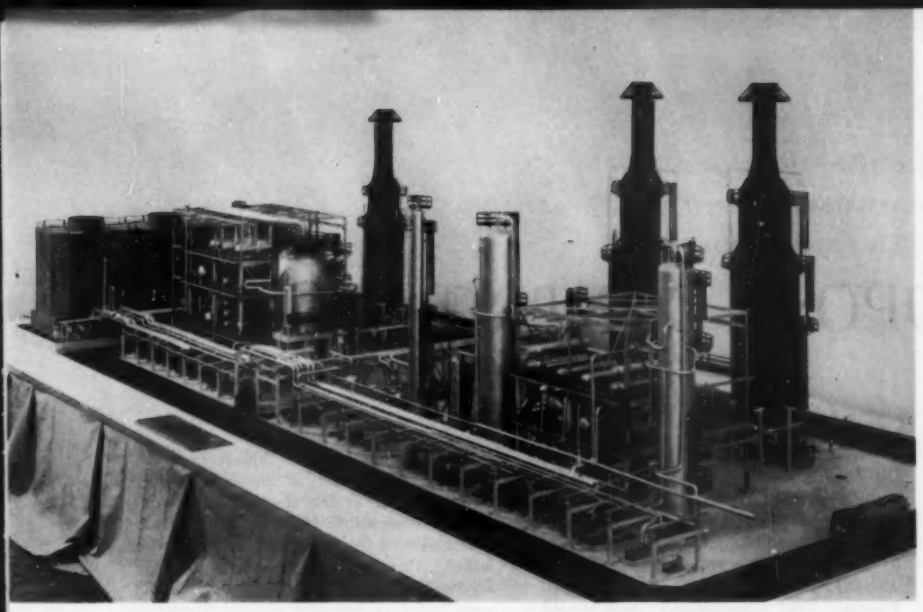


Fig. 3. Piping model with complete detail.

B. Structural model, which is the preliminary model with ladders, platforms, stairway systems and other major structural items added, plus a few of the major pipe lines. (Fig. 2).

C. Piping model, which is developed from the structural model. Details are added to make is at close a replica of the finished plant as is practical.

The first and perhaps the most important function of the plant model is to show the arrangement of the equipment. Due to the time element and the fact that at this stage the equipment outlines are not totally finalized, the reproductions are approximate. For plot plan purposes, the preliminary type of model is used. Heretofore, plot plans were made either directly on drawings, or paper cutouts of the equipment were used. Making plot plans directly on the drawings entailed considerable changing and redrawing. Using paper cutouts is an improvement, enabling discussion of the locations of equipment with the advantage of shifting the cutouts as required. Both of the above methods presented only plan views of equipment.

Due to the complexity of the modern refinery, a three-dimensional view is very desirable. In fact, when plot plans are made directly on the drawings or with paper cutouts and then later plot plan sections or elevations are made, the plot is usually rearranged because of apparent improvements brought out by sections. Models save all of this changing. We can arrange our equipment with the vertical clearances before us and eliminate many wasted hours in the drafting room.

Most plants consist of more than one unit. Each unit is given an identifying color, which is used on all equipment in that unit. In arranging the equipment, keeping units integral is merely a matter of following the identifying color. When finished, the model is repainted to customer standards.

The major points demonstrated on this model are: (1) accessibility of equipment for both operation and maintenance; (2) future expansion possibilities; (3) transportation facilities such as roadways; and (4) equipment handling facilities, especially in exchanger structures with trolley beams and tube bundle handling equipment.

Thus, the plot plan can be settled in a comparatively short space of time, and vertical as well as horizontal clearances have been taken into consideration. A plot plan is made based on the model arrangement. Detailed studies are then made for piping, ladders, platforms, structures, electrical equipment, etc.

The next step is to further develop the preliminary model into the structural model. At this stage, most of the equipment is firm and any necessary revisions are made to the pieces used on the preliminary model. As the name implies, mostly structural details are added, plus other pertinent items, with perhaps some of the large major piping. Stairwell systems for structures are made, ladders and platforms are added to vessels, principal pipe supports are added, and structural bracing is shown.

At this stage, the model is a good representation of what the finished plant will look like, with the exception of the piping. On this model, structural designers can see their bracing systems; structural draftsmen use it as an aid in interpreting design sketches; and all other phases of drafting benefit greatly from it, especially piping and electrical. Where previously it was necessary for a piping draftsman to study 25 to 30 drawings in order to get acquainted with a structure, he can now use the scale model to great advantage, using the structural drawings merely as reference for clearances.

The construction division can really study its problems on this model. Sequence of construction equipment movement and construction projects are readily solved from the model. On complicated jobs, models of cranes and other equipment are made, and the actual field conditions of installations are duplicated for study. Photographs of the model aid field construction personnel in planning and discussion.

The structural model is now made into the piping model. This is accomplished mainly by adding the piping and other details which have heretofore been considered refinements. Primary operating valves are also added, including control valve hook-ups. This model, besides being helpful to the design and construction division, is now used by the operator for training purposes and also for plant maintenance. It can also be used for planning shutdowns, future expansion, publicity, etc.

The value of scale models is so well established that they are made for all projects. Costs are nullified many times over by savings in man-hours and total elapsed time made possible by quicker decisions.

Scale models of refineries, power plants, etc. are here to stay. From helping sales through construction to operation their beneficial uses are unlimited. Every day new possibilities are brought forth, and the saying "see your plant before you build" is now a slogan of The Fluor Corporation Ltd.

PROPOSE CONTROLLED CO_2

AFTER an 18-month study of the Orco method of tertiary oil recovery, researchers of the Pennsylvania Grade Crude Oil Association have concluded that carbon dioxide is effective in increasing oil recovery from Bradford and Richburg oil sands.

Results of the investigation were given at the recent 16th annual technical conference on petroleum production at Pennsylvania State College. It was recommended that a controlled field test be conducted to supplement the laboratory work just concluded.

The Orco Process, involving the use of carbonated water as a flooding agent in depleted oil sands, was first announced in 1951.[1]. It is being tried on a commercial basis on one property in western New York and one property in the Bartlesville sand region in northeastern Oklahoma. It is the discovery of James W. Martin, a chemical engineer who has devoted much of his life to the dry ice and allied carbon dioxide industries.

Research work in the Pennsylvania Grade research laboratory at Bradford, Pa., was described at the State College conference by Dr. J. N. Breston, laboratory director, and his associates W. E. Johnson, R. M. Macfarlane and D. C. Neil. The voluminous report was divided into three parts for presentation: 1) Changes in Physical Properties of Bradford Crude Oil When Contacted with Carbon Dioxide and Carbonated Water; 2) Oil Recovery from Cores When Flooded With Carbonated Water and Liquid Carbon Dioxide; 3) The Effect of a Number of Variables on Oil Recovery From Cores When Flooded With Carbonated Water and Liquid Carbon Dioxide.

In a summary of Part 1, Dr. Breston reported that "contacting Bradford crude with carbon dioxide at high pressure causes considerable change in its physical properties. The solution of carbon dioxide in crude changes not only its volume, but also its viscosity and the interfacial tension between it and water. It is generally believed that any of these changes could effect the efficiency of oil recovery from oil reservoirs.

"In the order of their importance, it appears that volume expansion is first, at least in this particular instance. Where an oil volume expansion up to approximately 50 percent can be achieved, it seems quite possible that this would permit recovery of an appreciable portion of the reservoir crude. The degree of volume expansion of the crude is dependent upon carbonation pressure or the weight percent of carbon dioxide in solution. To affect greater crude oil expansion at comparable carbonation pressures, fresh water would be more desirable than brine since carbon dioxide is more soluble in fresh water than in brine. It has been shown, however, that in the case of sands containing dispersible clays, brine is more desirable as a flooding medium than fresh water. Also, in some areas it is the only flooding medium available. To attain the same weight percent of carbon dioxide in solution, higher carbonation pressures would have to be used with brine than with fresh water. If this is not practical, a greater volume of brine will be necessary to deliver the required amount of carbon dioxide to the reservoir.

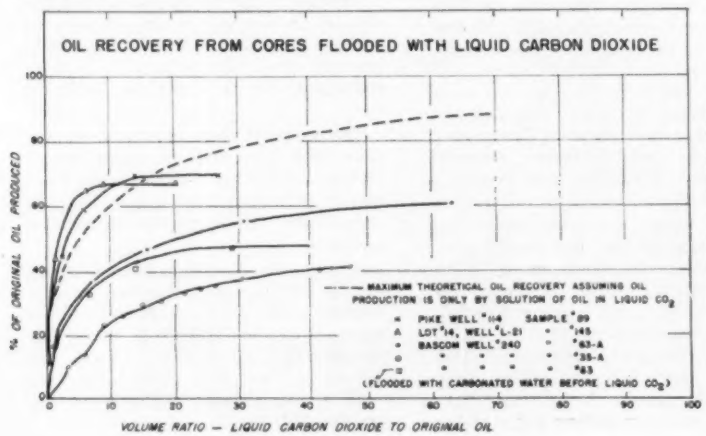
"Laboratory tests show that the number of volumes of water necessary to contact the crude to give maximum volume expansion are quite high. By increasing the carbonation pressure, however, the rate of expansion can be increased and the volumes of water needed can be reduced.

"The volume expansion of crude at comparable carbonation pressures is greater at lower temperatures. Thus, recovery should be favored by lower reservoir temperatures.

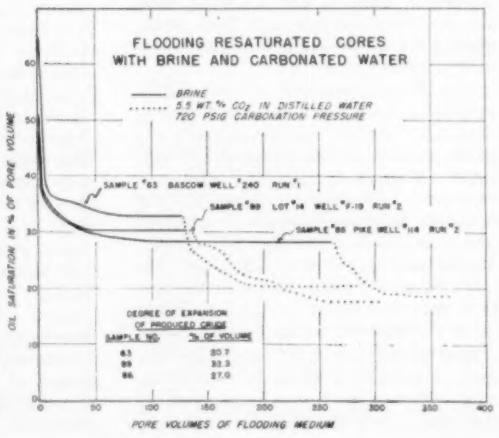
"A viscosity lowering of about 50 percent can be obtained by carbonating Bradford crude to 800 psig. Carbonation of water to 800 psig. has a negligible effect on its viscosity. This would have its beneficial effects in decreasing the viscosity ratio and increasing the mobility of the crude. The lower viscosity allows the oil

[1]WORLD PETROLEUM, Aug. 1951, pp. 22-25.

Oil recovery from cores flooded with liquid CO_2 is compared with a theoretical production curve which was developed by assuming that all production is only by solution in the liquid carbon dioxide.


OIL RECOVERY FROM CORES FLOODED WITH LIQUID CARBON DIOXIDE
% OF ORIGINAL OIL PRODUCED
VOLUME RATIO — LIQUID CARBON DIOXIDE TO ORIGINAL OIL
MAXIMUM THEORETICAL OIL RECOVERY ASSUMING OIL PRODUCTION IS ONLY BY SOLUTION OF OIL IN LIQUID CO2
PIKE WELL #14 SAMPLE #89
LOT #14, WELL L-21 #45
BASCOM WELL #240 #63-A
#55-A
#83
(FLOODED WITH CARBONATED WATER BEFORE LIQUID CO2)

For this experiment cores were resaturated with oil and then flooded first with brine and subsequently with carbonated water.


FLOODING RESATURATED CORES WITH BRINE AND CARBONATED WATER
BRINE
5.5 WT % CO2 IN DISTILLED WATER
720 PSIG CARBONATION PRESSURE
SAMPLE #63 BASCOM WELL #240 RUN #1
SAMPLE #89 LOT #14 WELL #I-19 RUN #2
SAMPLE #85 PIKE WELL #14 RUN #2
OIL SATURATION IN % OF PORE VOLUME
PORE VOLUMES OF FLOODING MEDIUM
DEGREE OF EXPANSION OF PRODUCED CRUDE
SAMPLE NO. | % OF VOLUME
63 | 20.7
89 | 32.3
85 | 27.0

FIELD TESTS

Pennsylvania Grade Crude Oil Association has conducted an intensive laboratory study of tertiary recovery of Bradford crude with the aid of carbon dioxide and found encouraging results to justify field testing.

to flow more freely through the minute pores and capillaries of the reservoir.

"A lowering of approximately 37 percent in interfacial tension between Bradford crude oil and water is effected by carbonating them to 750 psig. This would tend to lower the forces of capillarity and permit the release and flow of oil droplets in the reservoir pores. Thus, under such conditions, it may be expected that the relative permeability to oil would be increased.

"The composition of the crude can also be a determining factor with respect to the effectiveness of carbon dioxide in oil recovery. Tests have indicated that the lighter hydrocarbons are preferentially soluble in liquid carbon dioxide. Also, from the data showing the effect of crude composition on oil volume expansion, it can be inferred that the presence of light hydrocarbons (C_3 and above) may favor oil volume expansion. The limited solubility of crude in liquid carbon dioxide (about 50 percent at volume ratios of about five of liquid carbon dioxide to one of crude) together with selectivity for lighter hydrocarbons indicates that its use as a flooding medium would leave the heavier fractions of the crude behind. In the case of Bradford crude this would be the more valuable fraction."

The second part of the paper, which reported on laboratory experiments with field core samples, stated that an appreciable amount of additional oil was recovered. Increases in carbonation increased the oil recovery.

It was found that "the oil produced from these samples by carbonated water flooding was always expanded due to dissolved carbon dioxide. The degree of expansion varied from sample to sample and at times was somewhat higher than expected.

"Actual oil production was usually greater than that which can be explained on a basis of oil volume expansion. This occurred in carbonated water floods of both fresh and resaturated samples.

"Resaturated samples responded to carbonated water flooding as well as or better than the samples did when they contained their original reservoir fluids. This additional oil recovery was obtained from the resaturated samples with approximately 80 pore volume of flooding medium. This is less than that required when flooding the fresh samples.

"Flooding of fresh core samples with liquid carbon dioxide resulted in a considerable reduction in oil saturation. Recovery could be obtained with liquid carbon dioxide even after the samples had been flooded previously with carbonated water.

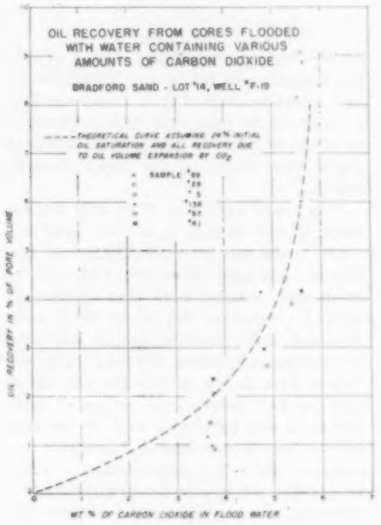
"Flooding a long core (Venango Sand) with carbonated water after depletion by fresh water flooding also resulted in a reduction in oil saturation. In one instance this reduction was accomplished with 93 pore volumes of carbonated water. In another test on the same core a considerable reduction in oil saturation was obtained by a combination evolved gas drive and carbonated water flood.

"During a carbonated water flood on the long core, a material balance was made on the amount of dissolved carbon dioxide entering and leaving the core. Only seven percent of the carbon dioxide gas could not be accounted for by carbon dioxide dissolved in the produced fluids or in the fluids in the core."

Possible practical aspects of tertiary recovery with carbon dioxide were dealt with in the third part of the paper and it was suggested that many of these can be learned only by controlled field experiments. It was stated that the laboratory work now is largely completed, but that field work must still be done.

"Although there are still several things we do not know about its mechanism, we believe we have learned that it works," the researchers said. "We have determined to our satisfaction that carbon dioxide will recover additional oil from core samples when used in the flood water of either secondary or tertiary recovery operations. We have also determined that it worked better than any other water flood or gas drive recovery method tested in our laboratory.

"Now the question is asked, Do you think it will work in the field? We do not think it is necessary to extrapolate our laboratory findings beyond reason to answer these questions. Data have been presented which can be interpreted to indicate that the carbonated water flooding method should work in the field. We have fairly well established the fact that oil sands such as the Bradford Third and the Richburg are receptive to carbonated water without any significant diminution in their permeability. We have shown that a long core as well as radial cores will respond to carbonated water flooding

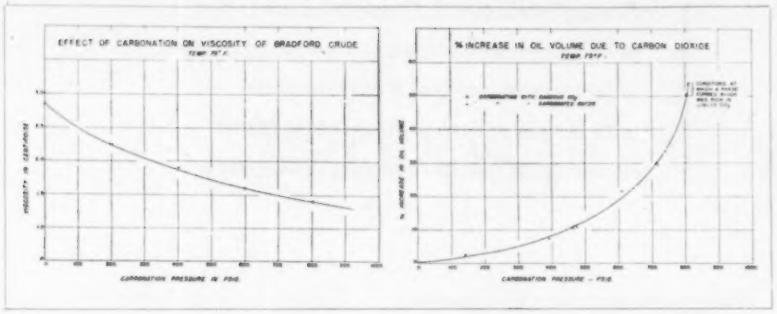

OIL RECOVERY FROM CORES FLOODED WITH WATER CONTAINING VARIOUS AMOUNTS OF CARBON DIOXIDE
BRADFORD SAND - LOT '14, WELL "F-19
OIL RECOVERY IN % OF PORE VOLUME
WT % OF CARBON DIOXIDE IN FLOOD WATER

Increases in carbonation of flood water are shown by the researchers to increase oil recovery from cores.

and produce oil which could not otherwise be recovered. Of course the geometry in the field is somewhat different, but we believe it should not be a deterrent factor. If enough carbon dioxide is used in a field operation and if a back pressure or reservoir pressure high enough can be maintained, there is every reason to believe it will work.

"Similarly, sufficient data have been presented to indicate that liquid carbon dioxide flooding should be able to recover oil in the field. As in the case of carbonated water, if enough carbon dioxide is used and if the liquid state can be maintained through the reservoir by keeping the pressure up, considerable recovery should be expected. When completely flooded, the average residual oil saturation may be as low as seven to nine percent. Theoretically, it is possible by liquid carbon dioxide flooding to extract up to 80 percent of the crude in place (Bradford crude). This would be more probable in a neatly layered sand of fair permeability. When flooding with liquid carbon dioxide, the pressure gradients necessary would be lower because of the lower viscosity.

This would make it more applicable in the case of tighter sands. It should also



be pointed out that liquid carbon dioxide has a preference for lighter hydrocarbons, and when flooding with it there would be a tendency to leave the heavier fraction of crude behind. In the case of Bradford crude this would be the more valuable portion.

"The next question, How well do you think it will work?, is a little more difficult to answer by extrapolation of laboratory findings. However, the data on fresh core samples show that an average of 31.7 percent of the oil in place after thorough water flooding can be recovered by carbonated water flooding. The extremes were as low as 19.5 percent and as high as 47.4 percent for groups of samples from any particular well. If the sand has not been water flooded thoroughly, the recovery might be a little higher, or about 34 percent. If it can be assumed that a combination gas drive and water flood can be made to operate, such as by reducing the pressures in the reservoir after complete carbonation and flooding, then the recovery will be increased by 4.1 percent to an average of 35.8 percent of the oil in place. Of course these figures are all based on the assumption that full carbonation of reservoir fluids will be attained, that is, at least 720 psig carbonation pressure. If the carbonation is less than this, the recovery will be proportionately less. To obtain high carbonation would mean keeping a back pressure on the producing wells and producing by flowing. Such a method of production has been shown to be possible.

"Experience has shown that most cores of Bradford or Richburg sands which flood in the laboratory will also flood in the field. In fact there have been many which flooded poorly in the laboratory, but which flooded successfully in the field. With this knowledge it can be inferred that carbonated water flooding should do as well in the field as is indicated above, and perhaps even better.

"A discussion of the practical aspects of the results of a laboratory investigation would be incomplete without a word about economics. However, since profit-making involves certain variables the value for which cannot be obtained from data such as these, we would not be justified in making a guess about it. Nevertheless, these laboratory results have given some indication of the amount of recovery possible by this new method. Hence, if it can be shown by reasonable estimates that the value of the recovery possible will more than balance the investment necessary to obtain this recovery, then the method may be tentatively considered a profitable proposition.

"Our data have pointed out a few things which if taken incorrectly may make the process look hopelessly impossible. One of them is the large number of pore volumes of carbonated water required to obtain ultimate recovery from core samples. As was pointed out earlier, the number of pore volumes used to flood out a radial core in the laboratory seldom comes anywhere near the number required to flood that sand in the field. Usually, several hundred pore volumes are required to do the job that only a few will do in the field. With this fact in mind, we would caution against condemning the process on this basis.

"Another factor which must be taken only qualitatively are the pressure gradients used in the laboratory floods. They definitely were higher than anything encountered in the field, except perhaps at the injection well. But, like the number of pore volumes of flooding medium, much higher pressure gradients are necessary in radial core flood pots to flood cores down to residuals that are obtained in the field with very much lower pressure gradients. We believe that if the handicaps of geometry and 'end effects' can be eliminated, laboratory core floods should not require any greater pressure gradients or numbers of pore volumes of flooding medium than are common in the field. Since this is virtually impossible, the pressure gradient and pore volume factors can be determined only by well controlled research experiments in the field. We would like to emphasize that we said research experiments, not field trials.

"Our research experiments have touched only lightly on the effect of such things as wetting agents, gases, and light hydrocarbon liquids in connection with the use of carbon dioxide and carbonated water. It is possible that any or all of these may exert some favorable influence on carbonated water flood recovery. Further research along such lines is certainly warranted.

"It is also possible that further research will show that other reservoirs or oil formations may respond even better to liquid carbon dioxide or carbonated water flooding than the ones described in this paper. Other crudes may show greater volume increases and viscosity reductions by solution of carbon dioxide than those exhibited by Bradford crude. If any chemical reaction is responsible for some of the extra recovery, then it is possible that other reservoir formations and their fluids may exhibit more of this than may have occurred in the sands used in this investigation. Only further tests will provide this information.

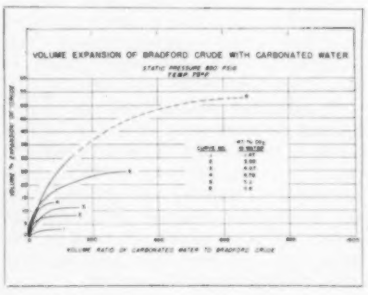
"Sufficient data have been accumulated to show that contacting Bradford crude with carbon dioxide and carbonated water will change some of its physical properties such as to make it more recoverable from Bradford and Richburg oil sands.

"Flooding tests on fresh and resaturated core samples have confirmed the fact that by carbonating the flood water a considerable amount of oil could be recovered that would otherwise be unrecoverable with ordinary brine or fresh water flooding. Flooding with liquid carbon dioxide will also recover additional oil, even to a greater extent than with carbonated water. However, the action in this case is a combination solvent action and flood which produces a crude containing more light ends. The crude produced by carbonated water flooding is the same as that produced by ordinary water floods.

"The effect of a number of variables on recovery have been indicated together with some practical implications. From these it can be inferred that liquid carbon dioxide and carbonated water flooding should work in the field as well as in the laboratory provided the same conditions are met.

"No conclusions can be drawn at this stage with respect to possible profitable operations of the process in the field.

"At best, the data from these experiments indicate that except for some additional investigations into the use of adjuvants, the process is ready for a controlled field experiment. This should not be just another trial, but a real test in an area which, on a basis of controlled flood-pot tests, shows some reasonable prospects of enough oil recovery to be considered practical."



THE OLD DUTCHMEN SAID:
'Een spiering uitgooien om een snoek te vangen'
(THROW A SMELT TO CATCH A PIKE)
THE PRICE OF A SCHLUMBERGER
IS NEGLIGIBLE COMPARED TO THE
LOSS OF AN OIL WELL

WHY OPERATORS PREFER SCHLUMBERGER

Schlumberger Well Surveying Corp. • Houston, Texas

• It takes skill, experience and tailored-to-the-job equipment to tame a river . . . turn its strength into harnessed horsepower . . . hurl that power cross-country so it can be used. Chile's doing it and has already harnessed some of this potential horsepower.

At the new Abanico and Pilmaiquen Dams, for example, G-E generators change flowing water into electricity . . . saving natural resources. G-E line equipment, transformers, switchgear play their part in speeding this power to Chilean industry such as the huge G-E equipped steel mills at Huachipato. Homes, too, benefit. Pilmaiquen alone supplies hundreds of farms.

Beyond the equipment, General Electric is proud to contribute technical know-how needed in the development and use of this power. G-E facilities and representatives around the world . . . stand ready to help you with your electrical needs and problems, efficiently and dependably . . . now as they have done for the past 60 years.

1A-52-22E

GENERAL ELECTRIC

Seven acre plant studies catalysis

A QUARTER OF A CENTURY AGO, when catalytic cracking was in its primary research and development stage, early experiments under the direction of Eugene J. Houdry were conducted in apparatus which could be placed on a kitchen table. Catalyst was pelleted in a hand press. Today the Houdry Process laboratories occupy a seven-acre tract near Philadelphia. In this modern institution 15 to 20 pilot plant units are in operation to search out new facts.

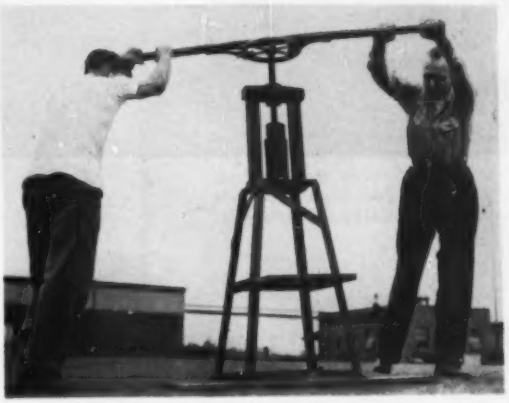
As the catalyst is the heart of all Houdry processes, principal effort of Houdry's research department is directed to development of new catalysts and the improvement of those currently used.

In the course of obtaining fundamental information on catalysis, Houdry scientists have investigated all phases of the subject regardless of their pertinence to refinery applications. Such apparently unrelated subjects as mineralogy, glass chemistry, bio-catalysis, corrosion, and even chemi-luminescence have been studied in the Houdry laboratories to obtain correlations which lead to a basic understanding of catalytic activity.

These excursions into pure science are beginning to pay off. Through a deeper understanding of the properties responsible for catalyst activity, Houdry chemists now are better able to develop catalysts for specific purposes—thereby broadening the field of catalytic applications beyond cracking processes.

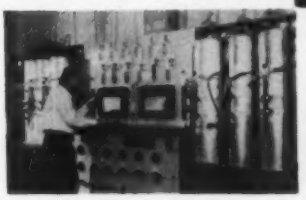
After a process has been developed commercially, the development laboratory continues to study the process variables and new problems with a view toward constant improvement. The method which Houdry engineers employ in these studies is to "unitize" each operation and then study it by fundamental and empirical approaches. Thus, in the Houdriflow unit, the cracking operations and catalyst flow rates are investigated empirically, whereas the kinetics concerned with catalyst regeneration can be studied fundamentally. Such studies constitute the basis for improvements in design and operation.

Ultimate and probably not too distant goal of Houdry research and development is to reduce catalysis and catalytic operations to an exact science. Then it will be possible to tailor a catalyst and design a catalytic process for a specific need.



Hand press once used to prepare pelleted clay catalyst for Houdry's early development work.

Dr. G. Alexander Mills, director of research, illustrates the possible effects of crystal lattice structure on catalyst activity to research chemists George Bond and Gerald Hinden.

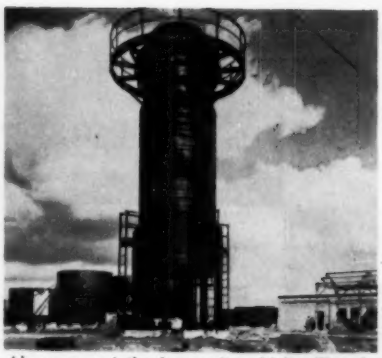


In this battery of six small catalytic cracking units charge stocks are cracked and fractionated under a standard set of conditions.

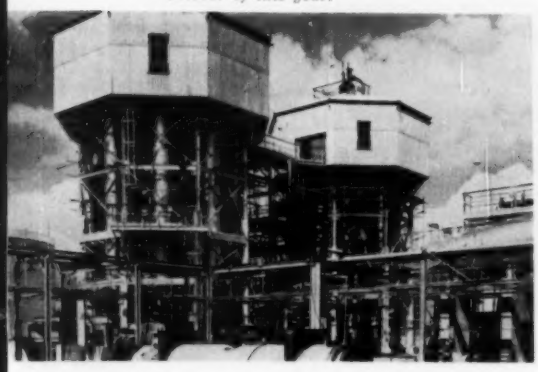
Houdry research and development laboratories in Linwood, Pennsylvania.

Aerial view of the 3,200-foot long jetty, one of the largest oil docks in the world, showing three of the four breasting islands which can berth four tankers up to 40,000 tons simultaneously.

FIRST YEAR AT FAWLEY



Above, one of the four units which will make up the lubricating oils plant, due for completion in the Fall of 1953. Below, construction view of the polymerization plant, completed in October of this year.



ESSO PETROLEUM CO. LTD. has completed a full year of operation of its large new refinery at Fawley, England. In that period the plant has processed six million tons of Middle East crude oil and produced 1,750,000 tons of gasoline, 300,000 tons of kerosine and 3,500,000 tons of fuel and gas oils.

During the first year the jetty at Fawley handled 701 tankers of which 348 discharged Middle East crude. The 3,200-foot jetty now can accommodate four tankers simultaneously. Ships up to 40,000 dwt can be handled at low tide.

Approximately a million tons of refined products were exported during the first year, aiding materially in the country's balance of trade. About 84 percent of the plant's output was consumed in the United Kingdom.

The catalytic cracking plant has had a successful year's operation during which it produced over 100 million gallons of high octane gasoline which is at present blended with lower grade motor fuel to "pool" specification. The catalyst used in the plant is now made at a factory specifically built for that purpose in Lancashire.

The value of finished products as shipped from the refinery during the year was over £60 million, and taxation on the motor spirit and diesel oil produced represented a revenue to the exchequer of £75 million. This latter sum indicates what a vast internal income accrues to the government from petroleum operations

After deducting the dollar component in the imported crude oil from the value of the refined products, which would otherwise have to be purchases for dollars, a saving of some $80 million is shown.

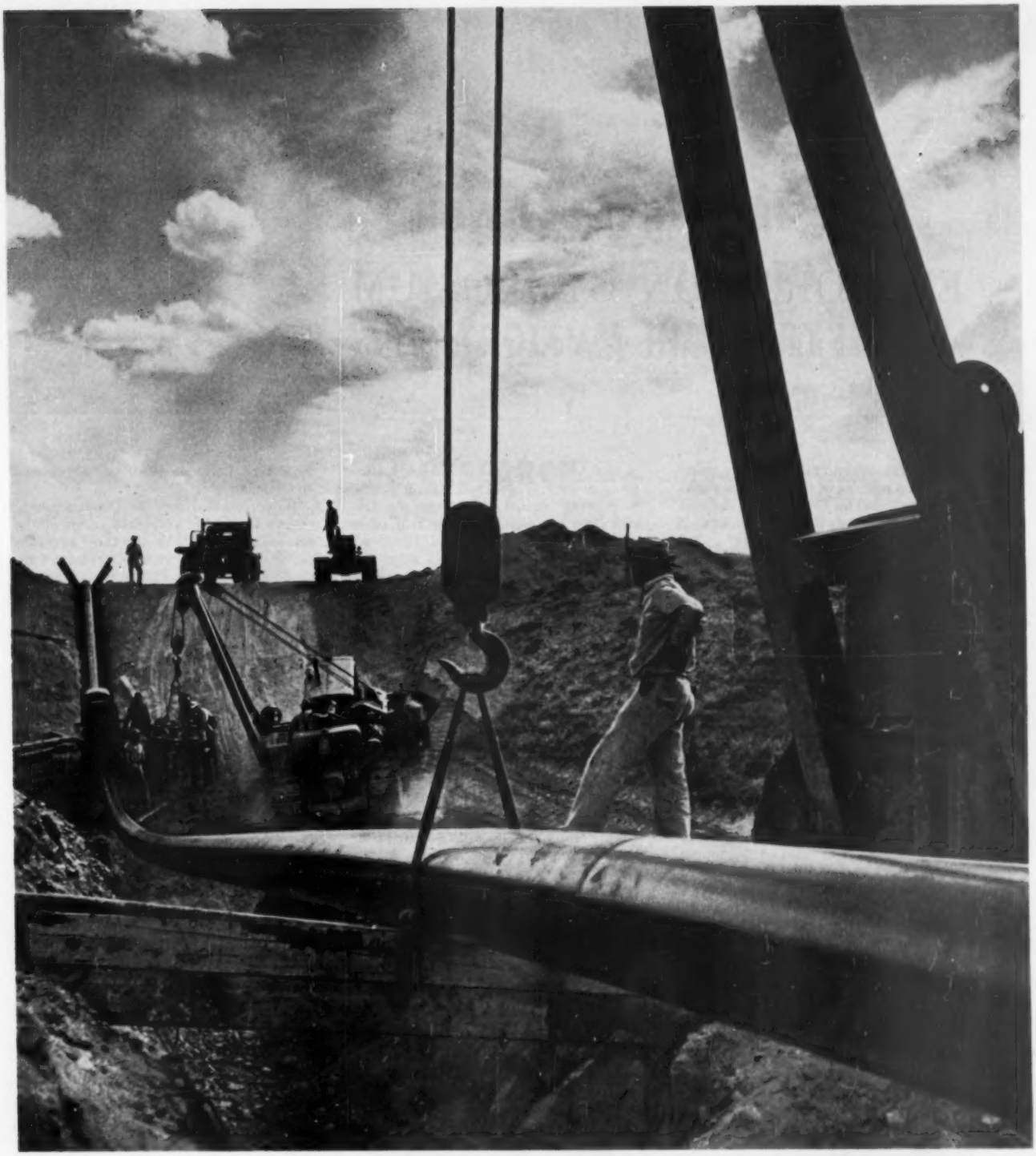
Output of the plant in 1953 is expected to rise to 6.5 million tons as new installations now being erected are brought on stream. The saving of dollars in the coming year is estimated at more than $100 million.

The catalytic polymerization plant was completed in October and now is being operated. Progress is being made in building the new tractor fuel plant. This unit is expected to be ready for operation by April 1953 and will represent an important new British source for distillates.

A sulfur plant is being built to recover sulfur from sour Middle East crude. This unit will produce about 12,000 tons per year of elemental sulfur.

Present construction plans at Fawley will be complete by next September when the lubricating oil section of the refinery is ready for operation. At that time Fawley will manufacture a complete line of oil products except for certain specialties.

Dr. Frank Mayo now heads Fawley operations as manager. He was promoted to this post on Sept. 1 when George Noble was transferred to company headquarters as general manager of refining. Dr. Mayo has been active in the refining branch of the industry for the past 17 years. At 41 he becomes manager of Europe's largest oil refinery.



"A persistent drive of civilized men at all times and in all places has been to find ways of tapping sources of energy, and applying that energy to supplement the muscle-power of themselves and their animals. Only by multiplying the energy at their command can men lessen the obstacles of time and space and improve their conditions of living."

STANDARD OIL COMPANY
(NEW JERSEY)
AND AFFILIATED COMPANIES

EVAPORATION SYMPOSIUM

A FEATURE AT CHICAGO API MEETING

J. H. McClintock

AN OUTSTANDING FEATURE of the recent annual meeting of the American Petroleum Institute at Chicago was a symposium dealing with "Evaporation Loss of Petroleum from Storage Tanks." The symposium was prepared by the Program Committee on Evaporation of the API Department of Technical Services under the chairmanship of J. H. McClintock of Esso Standard Oil Co.

The committee was appointed by API President Frank Porter on recommendation of the General Committee of the Division of Marketing. Its membership includes each division of the industry and its studies have embraced production, transportation, refining and marketing.

Although the evaporation committee has been in existence only a short time, it presented at Chicago a series of group papers which represent a tremendous amount of research. Technical literature on the subject was studied beginning with the work of J. H. Wiggins published thirty years ago while he was still with the U. S. Bureau of Mines. Some 85 articles are listed in the bibliography appended to the 35,000-word report, and seven nomographic charts are given to assist in solving storage loss problems.

The committee reported that although it had worked to compile known factors dealing with evaporation, there is still much to be learned. "Although the data submitted for riveted floating roof tanks are reasonably complete and accurate," the committee said, "the data submitted for most other tanks are not only insufficient, but they are somewhat out of date and should be supplemented with current data on more recently erected tanks with the latest improvements." A point of need is in the case of welded floating-roof tanks with new sealing ring designs and the determination of permeability of flexible diaphragms."

It may be assumed that the work undertaken by the committee this past year will be continued in the future so that the needed additional data will be developed. Members this past year included R. M. Bartlett, Gulf Oil Corp.; W. H. Creel, Philips Petroleum Co.; J. H. Field, Sohio Petroleum Co.; R. N. Giles, Standard Oil Co. (Ind.); E. L. Hoffman, Socony-Vacuum Oil Co.; J. G. Jordan, Shell Oil Co.; J. T. McCoy, Tide Water Associated Oil Co.; A. E. Miller, Sinclair Refining Co.; F. W. Miller, Esso Shipping Co.; H. C. Packard, Shell Oil Co.; T. C. Smith, General Petroleum Corp.; and L. S. Wrightsman, Humble Pipe Line Co. Many others served on subcommittees.

In preparation for the Chicago symposium the field of evaporation from storage tanks was divided into three general parts and assigned to subcommittees for study and report. Part one was a review of the basic theory and mechanism of evaporation and an outline of the practical problem presented to the industry. The group paper was presented by C. C. Ashley of Redwood City, Calif., vice chairman of subcommittee "A."

The subcommittee sought to translate theoretical data and observed experience into practical factors of sufficient accuracy to permit valid evaluation of probable loss conditions for tankage. While general statements are applicable to both gasoline and crude oil, the subcommittee said that more data are needed for crude oil. To suggest the variables which may effect calculations, the committee presented a detailed analysis of the various events which occur in a typical 24-hour period in the life of an average oil tank. An evaluation was presented of the effects of temperature changes, vapor pressure, wind, vapor space volume, tank size and proportions and time. New vapor pressure charts were developed.

Part two of the symposium was presented by I. L. Wissmiller of Chicago Bridge and Iron Co. on behalf of subcommittee "B" to which was assigned a study of cone roof tanks operating at essentially atmospheric pressure. The committee felt that this study was of especial importance as a basis for evaluating the economics of modern vapor saving storage facilities since cone-roof, atmospheric-pressure, vapor-tight tanks are the minimum acceptable standard in the industry today. It was concluded as a result of the subcommittee's study that the monetary value of losses from this type of storage is so large that the work of the many men who are diligently

(Please turn to page 68)

H. L. O'Brien

I. L. Wissmiller

C .C. Ashley

Q. HOW EXTENSIVE ARE DU PONT SERVICES TO THE PETROLEUM INDUSTRY?

A.

RESEARCH—The Petroleum Chemicals Division offers extensive services in connection with the utilization of gasoline additives. They include basic research at the Du Pont Petroleum Laboratory as well as the facilities of five strategically located district laboratories. Included also are the findings developed by the Du Pont fleets of fuel and road test cars.

SAFETY-MEDICAL—To help refiners maintain a high record of safety in the use of tetraethyl lead compounds, Du Pont safety and medical services include periodic medical examinations, personnel training and attendance at tank cleaning and repair operations.

MANUFACTURING—Du Pont specialists are prepared to help refiners design, build and put into operation TEL blending plants. And they are always available for consultation on any phase of petroleum products manufacture involving the use of additives.

MARKETING—In marketing, Du Pont offers services such as the quarterly motor gasoline quality survey, the production of motion pictures useful for promotion and dealer training, use of the Du Pont test fleet cars for customer and dealer demonstrations and a wide range of sales promotion aids.

DU PONT

Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

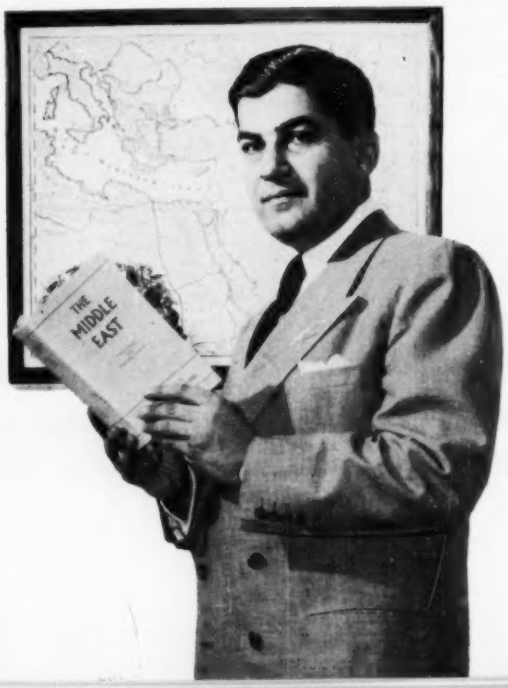
E. I. DU PONT DE NEMOURS & CO. (INC.) • Petroleum Chemicals Division, Wilmington 98, Delaware

A NEW APPROACH

Conflicting political and economic pressures in the postwar world make it essential that future oil supplies for the free world be assured by developing new international concepts. Extension of the U. S. Oil Compact to a Pan American scope and development of an Eastern Hemisphere plan is suggested as a basis for solution of future difficulties.

By Walter J. Levy

This paper by Walter J. Levy, consulting economist and specialist in foreign oil problems, was presented before the Petroleum Branch of the American Institute of Mining and Metallurgical Engineers at its fall meeting in Houston, October 1, 1952.



Since the beginning of World War II, foreign oil has gained an ever greater importance in the oil supply of the United States and the other nations outside the Soviet orbit. During 1939, this country produced over 3.6 million barrels daily of crude oil and related products permitting, after satisfying domestic requirements, a net export of some 350,000 barrels a day. Beginning with 1948, the United States has been a net importer of oil, and during the first half of 1952, when production, at 6.7 million barrels daily, was over 85 percent higher than in 1939, the net imports of the United States amounted to some 500,000 barrels daily.

The most recent studies of the future development of the U. S. oil industry indicate that this trend toward an ever growing importance of foreign oil in the U. S. supply pattern will not only continue, but is likely to be greatly reinforced. According to estimates of the President's Materials Policy Commission (PMPC), this country, by 1975, will produce 11.2 million barrels daily of crude oil and related fuels, including shale oil and other synthetics. Its requirements will be as much as 13.7 million barrels daily, necessitating net imports of 2.5 million barrels a day. As a result, it is likely that the United States, which has in the past obtained the bulk of its imports from the Caribbean area, will in the future absorb not only the total surplus production in the other countries of the Western Hemisphere, but will also require large supplemental quantities of crude oil from the enormously rich fields of the Middle East. Similarly, the free countries in the Eastern Hemisphere, which procured a large portion of their oil needs before World War II from the United States and the Caribbean, import now over two-thirds of their greatly increased requirements from the Middle East and less than one-quarter from the Western Hemisphere.

This change in the supply position of the United States and the free world is based on a fundamental shift in the relative size of proven crude oil reserves in the United States and in foreign oil-producing countries. At the end of 1938, U. S. reserves, at 17.3 billion barrels, constituted 61 percent of total free world reserves of 28.5 billion barrels. By the beginning of 1952, proven crude reserves in the United States, although they had risen to 27.5 billion barrels, represented only 29 percent of the reserves of the free nations, which had reached a total of 95.5 billion barrels. Foreign reserves, mostly located in the

Middle East, had accordingly increased from 11.2 billion to 68 billion barrels. If the most recent estimates for Middle East oil reserves had been used, the latter figure would even be some 20 billion barrels higher.

As a result of the discovery of these vast new reserves, crude oil production in foreign countries after the end of the war could be expanded readily in response to the change in the supply position of the United States and to the rapid rate at which foreign oil consumption increased. Production in the Western Hemisphere countries outside the United States rose from some 1.3 million barrels daily in 1945 to 2.5 million barrels daily by the end of the first half of this year. By 1975, the PMPC anticipates that Western Hemisphere crude production outside of the United States will amount to 5.9 million barrels daily and will exceed requirements by 1.3 million barrels daily. This excess will be available to help meet the deficit in the United States.

In the Eastern Hemisphere, production has expanded even more rapidly from about 600,000 barrels daily in 1945 to more than 2.6 million barrels daily by the middle of 1952—and this is in spite of the loss of over 600,000 barrels daily in Iran. In 1975, according to the PMPC, production may amount to as much as 9.7 million barrels daily, the great bulk of which will originate in the Middle East. The Eastern Hemisphere will thus be able not only to meet its own requirements fully, but also to contribute 1.2 million barrels per day to the deficit expected to exist in the United States at that time.

The conclusion is inescapable that for peace, cold war or hot war, this country and the rest of the free world must rely heavily not only on supplies from the United States, but also on the large-scale availability of oil produced in the other countries of the Western Hemisphere and in the Middle East. It is significant that in the past, the bulk of foreign oil has been obtained in Venezuela and five underdeveloped nations or protectorates in the Eastern Hemisphere: Saudi Arabia, Iran, Kuwait, Iraq, and Indonesia. A great deal has been written about the oil resources of these countries and in this context it need only be pointed out that by the middle of 1952, even with Iran not producing, they accounted for about 80 percent of the total foreign crude oil production of the free countries of the world.

It is equally significant that American and British or British-Dutch-owned companies are the producers of the preponderant part of the total oil output in foreign countries. These companies, several decades ago, obtained rights and concessions for the search and exploitation of oil, in many instances with the assistance and support of their governments. As a result of their initiative and investment, they have discovered large foreign oil resources.

Crude production of American companies outside the United States amounted to 3.0 million barrels daily by the middle of 1952, over five times as much as in 1939. Production of British and British-Dutch companies meanwhile had about doubled to reach a level of 1.6 million barrels daily. As a result, the share of American-controlled production in foreign countries increased during this period from 37 to 59 percent of total output while that of the British and British-Dutch companies declined from 49 to 30 percent, partly, of course, due to the events in Iran. The share of companies of other nationalities also declined from 14 to 11 percent.

Particularly striking has been the increase in the share of American companies in Eastern Hemisphere production. It increased from 17 percent in 1939 to 59 percent by the end of the first half of this year, while the British share declined from 76 percent to 33 percent. In the Western Hemisphere outside the United States, the share of American companies in production by the middle of 1952, at 58 percent, and that of British and British-Dutch interests, at 28 percent, showed only minor changes as compared with 1939. It should be noted that the above percentages are in most cases determined in line with the stock ownership in producing companies rather than on the basis of the quantities of crude oil actually taken; that is, they do not allow for any long-term supply contracts between the various companies.

The American and British interests in foreign oil are held almost exclusively by five American and two British or British-Dutch companies, either singly or in various combinations of ownership. At different times smaller American and British corporations, as well as companies of other nationalities, have taken an interest in foreign oil development. With the exception of a few companies operating in Venezuela, however, their attempts to discover oil have either proved unsuccessful or their material resources have been too small to cope with the immense risks, to provide the necessary large investment, and to deal simultaneously with the political and commercial problems that confront all oil operators in foreign countries, and about which more will be said later. This was strikingly illustrated recently when the Superior Oil Company abandoned its offshore concession around Qatar and withdrew completely from operations in the Persian Gulf area because of the high cost of exploration, unfavorable general political conditions, and some uncertainty regarding the legal status of concessions beyond territorial waters. Interestingly enough, the Royal Dutch-Shell group was willing to assume these risks and has entered into a new concession arrangement for these areas.

The most important foreign oil rights are held through concession contracts between the oil companies and the governments of foreign countries. The contracts usually cover very large areas and are of long duration, generally between 40 and 99 years. Of the six important foreign oil producing nations, only Venezuela has a mining law establishing the ground rules for the issuance and operation of concessions. The Middle Eastern countries have granted oil rights on the basis of individual concession contracts with the companies. Traditionally the companies there have been granted a relatively large degree of freedom of management and operation, permitting them to produce and export in accordance with their commercial programs and needs without undue restrictions imposed by the producing countries. Under the concession agreements, the compensation to the government usually takes the form of royalties levied against production plus taxes on income. The terms, as recently revised in line with the pattern established in Venezuela, assure the producing country, in most cases, of about 50 percent of the net profits from the operations.

The relatively great freedom of the oil companies to manage and operate their oil properties in foreign countries was essential to the success of the operations. This freedom was necessary, among other reasons, not only because of the backward state of the governmental machinery and other institutions in most of those countries, but also because risk capital could otherwise not be attracted on a sufficiently large scale.

As a result, foreign oil resources were available without undue restrictions to the companies in line with their programs and

(Please turn to page 56)

A New Approach

(Continued from page 55)

needs. Foreign oil has likewise formed a dependable and essential part of the oil supply of the free nations. World War II could not have been won without the free availability of foreign oil to the Allies, and the present cold war also could not be effectively conducted without it.

The development of foreign oil resources in the postwar period has been increasingly affected by a series of new political and economic factors which were responsible for important changes in the basic arrangements between the producing countries and the operating companies. Many of these adjustments were called for by the newly developing political and economic conditions and, as such, do not raise any basic problems. What is most disturbing, however, is the emergence of excessive political and economic pressures which may well threaten to undermine the very basis for effective foreign oil operations. We may perhaps list the most important of these major forces.

There is, first of all, the decline of British power. This power has effectively maintained order in the Middle East and had directly supported British companies in their bargaining with the oil-producing countries there, thus indirectly benefiting American companies as well. The American government has been reluctant to assert its power in a similar manner and the Middle East countries are keenly aware of this fact.

As a corollary to this development, there is the growing desire of the various oil-producing countries to subject their oil resources to direct national control and to formulate and carry out their own oil policies. Foreign investments in and control over basic raw materials invariably excite some envy and resentment. Local interests may easily be tempted to try to gain an increasing degree of control over these resources. In view of the newly awakened nationalism, particularly in the Middle East, and of the basic insecurity of those countries in the East-West struggle, such temptations have been greatly reinforced since the war.

In particular, the assertion by any oil-producing country of its power to cancel foreign oil concessions through nationalization, as dramatically illustrated by events in Iran and by the lack of jurisdiction of the International Court in the case, may well have serious repercussions on the security of oil concessions elsewhere. Since the producing countries of the Middle East are actually unable to direct the complex technical and commercial operations of the oil industry, extreme interference would, on the one hand, hamper the development of badly needed oil resources. It would, on the other hand, jeopardize the flow of new foreign private investments which is so important for the future prosperity of underdeveloped countries and for the stability of the free world.

In any case, the various oil-producing countries feel that their vast oil reserves should make it possible for them to gain a much greater international political and economic importance than their general standing in the council of nations and the strength of their under-developed economies would otherwise warrant. This possibility, they often feel, is enhanced by the East-West struggle which increases the dependence of the free world on their oil. Moreover, the strategic location of the Middle East countries and the power conflicts centering around them should enable them, so they believe, to achieve their own goals without the risk of intervention of either side by playing the East against the West.

The oil companies in their operations abroad must obviously abstain from any political activities. Accordingly, they must carry on their work in cooperation with the governments as they find them. Their neutrality will thus frequently give the appearance of support for the parties in power, be they honest or corrupt, enlightened or shortsighted, popular or despised. The standing of the local governments may thus easily affect the position of the companies.

Also, the oil industry represents, in most instances, the only large-scale and modern enterprise in the country. As such, it may give rise to political, social and economic strains, particularly in the otherwise ancient society and underdeveloped economy of Middle East countries. The revenue from oil operations is frequently the largest single source of income, and is, at least in part, the personal property of the rulers. In many cases effective budgetary controls of government income and expenditures do not exist; and the companies do not possess any direct influence to assure the use of the funds provided by them for the economic progress of the country and its people.

The rights governing foreign oil developments are usually established by a contract between the sovereign foreign power and the American or British company. In many instances, the private corporation has proved to be increasingly at a disadvantage when issues arise between it and the foreign sovereign who has frequently the means of pliable legislation at his disposal.

In particular, each of the producing countries usually insists on as favorable arrangements with its oil industry as those granted by any company anywhere else, regardless of any special circumstances or the particular merits of the case. Accordingly, no adjustments in the concession terms can be made anywhere without sooner or later causing similar adjustments to be made everywhere. The flexibility necessary to achieve optimum results for all concerned is thus being lost.

The oil companies operating in foreign countries are inevitably affected by a number of additional considerations. As American or British corporations, for instance, they are subject to the laws and policies of their home governments. At the same time, the various producing countries obviously expect them to abide by the local laws, policies and customs. Furthermore, the transit countries, through which the Middle East pipelines run, have their own set of conditions which they feel they should impose. The consuming countries, in turn, insist that the companies give predominant consideration to the interests of the importer. And finally, as corporations responsible to stockholders, the companies must, of course, also try to manage their affairs in line with commercial factors and possibilities.

Foreign oil trade is subject to many diverse claims. To illustrate some, but by no means, all, of the diverse pressures on international oil operations, one may perhaps follow the various interests in the course of an oil transaction from a producing field in the Middle East to the market in Western Europe or the United States.

The producing country would like to obtain a maximum income from its oil. It is therefore interested in the largest possible royality and also a high price, as such price would increase the profit of the operating company subject to its taxation. The country would, for the same reason, insist on maximum production and sales of its oil and also on the quickest feasible development of its reserves. Such pressure for production and sales may easily conflict with the desires or needs for outlets of other producing countries. It may also exceed the practical possibilities existing for the present operators to provide the necessary capital and markets, and it may interfere with their commitments in other producing areas. The producing country would also prefer to have its oil refined locally as this would increase the value of exports and result in additional employment and industrial activities. It would, further, like to receive its income to the greatest extent possible in hard currencies. Finally, it would be concerned with the destination of its exports, at least to the extent that such trade might affect its political or commercial interests.

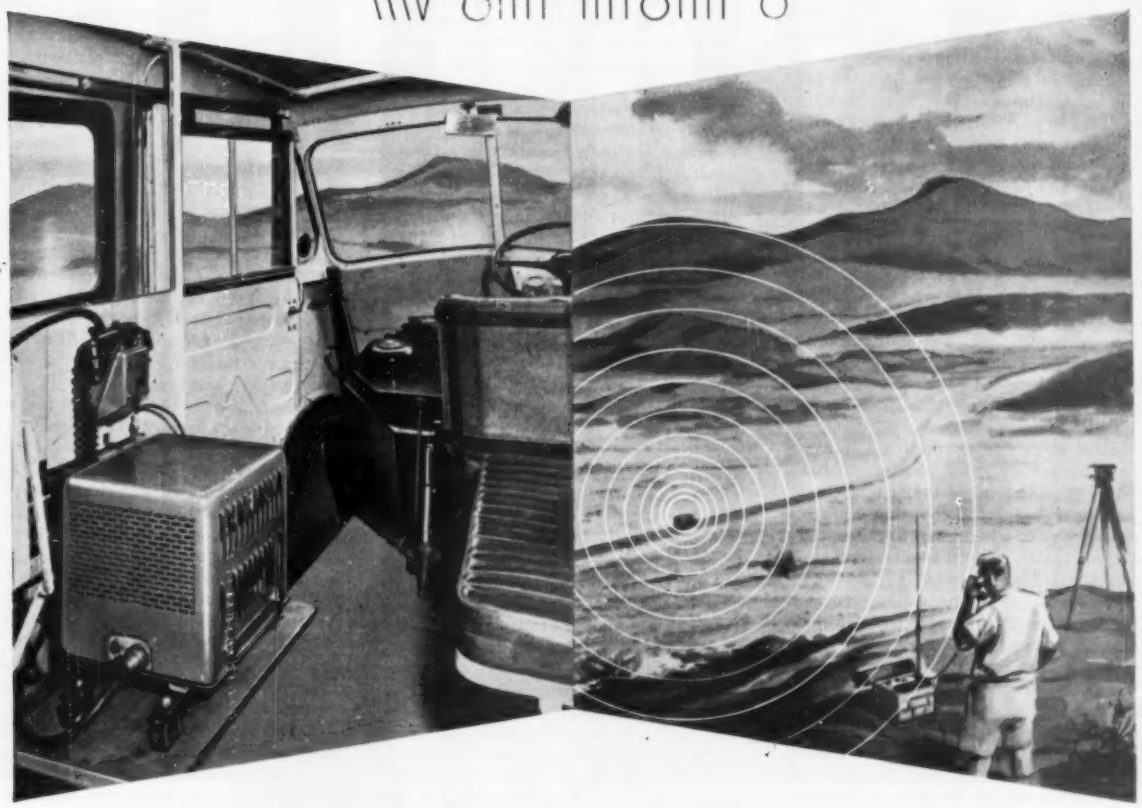
The transit countries through which the pipelines from the Persian Gulf to the Eastern Mediterranean are laid and through which the oil will pass are likely to make another series of requests of the operating company or the operator of the pipeline. They would ask for a maximum income from the pipeline operators; they would want their oil needs to be covered on favorable terms; and they, too, would try to establish some measure of control over the destination of exports, in accordance with their own political considerations.

The consuming and importing countries, in turn, would like to obtain the oil at the cheapest possible price. They would prefer to receive it as crude oil rather than as

(Please turn to page 58)

Keep in touch by

V.H.F.



Once your transport has left base it need never be out of touch if type P.M. radio equipment is installed. Of exceptional rugged construction this set has been designed to withstand and will take the rough treatment to be expected from bad or non-existent road surfaces. An operating range of over 20 miles is obtainable between two P.M. sets, one mounted in the vehicle and one located at base. The equipment may be mains or battery driven and is arranged for remote operation from a telephone type unit. It is suitable for breakdown vehicles, safari trucks and for geological and survey work. A portable (20 lb.) set is also available for working either to base or to the mobile station.

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.

RADIO AND TRANSMISSION DIVISION, STROWGER HOUSE, ARUNDEL STREET, LONDON, W.C.2.

Telephone: TEMple Bar 9262 *Cablegrams:* Strowgerex, London.

AT 14231—8X107

A New Approach

(Continued from page 56)

finished products in order to save foreign exchange and to provide employment and industrial development in their countries. In nearly all instances, they would like to pay a minimum amount of hard currency and a maximum amount of soft currency. They would also be interested in procuring their oil from a variety of sources rather than from one producing country or company in order not to become too dependent on a single supply base. If the oil should be sold in the United States, its commercial fate woud be affected by a further series of considerations related to the problems of security as well as the position of the United States' domestic oil industry. In particular, welcome as foreign oil would be in the United States during periods when the gap between domestic supplies and requirements is widening, its arrival would be bitterly contested when this gap is narrowing and great pressure would be exerted to limit its import.

The United States, as the parent country of the operating company, would, in its turn, insist that the foreign production, transport, refining and marketing operations of the company be in accord with U. S. laws and policies. The United States would also be vitally interested, in line with its own political and commercial considerations, that the oil would always—in peace and war—be available to itself and to the countries of the free world.

There remains, finally, the operating company itself, which must try to satisfy all these partly, or even wholly, conflicting interests and which must still act under U. S. laws and policies and in accord with sound commercial principles. In this respect the producing company is obviously concerned with the problem of fitting its production and sales in any one country into its overall program for capital investment, production, transport, refining and sales. Similarly, it is vitally interested in the safety of its investment, the return on such investment, its freedom of management, and its protection against any arbitrary requests or changes in operating conditions. It can probably never satisfy any single one of the various parties concerned completely without ignoring some claims of another interested group.

Thus the lot of the oil company engaged in foreign operations is indeed not an easy one. In view of all the pressures and obstacles facing American oil companies abroad, no one should have been surprised if the companies had never ventured into the field of foreign oil. But if the foreign oil resources had not been effectively developed or, even worse, if they had fallen under the control of a hostile power, the United States, the producing countries, and the whole free world would have been the poorer, and their survival in the present power conflict might well have been placed in jeopardy.

What about the future? Undoubtedly the overriding strategic, political and economic importance of foreign oil, the conflicts centering around it, and the structure of the industry itself offer political, economic and legal problems of their own. The solution of these problems can only be achieved on the basis of an equitable reconciliation of all interests concerned. It is imperative to apply the rule of reason and to limit the requests and policies of each party to what is possible and feasible in the circumstances, taking into account that vital national and commercial interests, not only of the United States, but of the whole free world, are at issue. Any other approach by the different parties could only jeopardize their entire position in foreign oil.

But there actually exists a great community of interest among the operating company, its parent country and the oil-producing and consuming countries. Each one makes a major contribution to the others' prosperity, economic stability and security, and none of them could actually do as well without the contribution of the others. Oil in the ground in the underdeveloped countries of the Middle East or elsewhere is of value to no one. It required the capital and skill of the American and British companies to bring it out of the ground—a skill and an investment that cannot presently be duplicated in the underdeveloped countries. It also requires the markets of the importing countries to translate the oil resource into an economic value. The cooperation of all is needed in order to assure the economic prosperity and the security of each one.

There are indications that an awareness of this basic community of interest is slowly developing, even though destructive forces tend to hide the constructive trends. In spite of, or perhaps even because of, the present turmoil about foreign oil, the time has come, I believe, when another look should be taken at the problems of foreign oil and at possible ways and means of reconciling and protecting the interest of the United States, of the other oil-producing and consuming countries of the free world, and of the operating companies.

The first, though unsuccessful, attempt along these lines was perhaps made in 1944 through the negotiation of an Anglo-American Oil Agreement. This effort failed, largely because of the opposition of important segments of the U. S. Congress and of the U. S. oil industry which feared that such an agreement might be used to establish federal control over domestic oil operations and to promote an oil cartel. Much has happened since 1944, and it is obvious that foreign oil is becoming increasingly important to the free world, that we cannot permit it to be treated like a political football in national policy or international relations, and that the issues and the stakes involved far transcend the interests and capabilities of any single party.

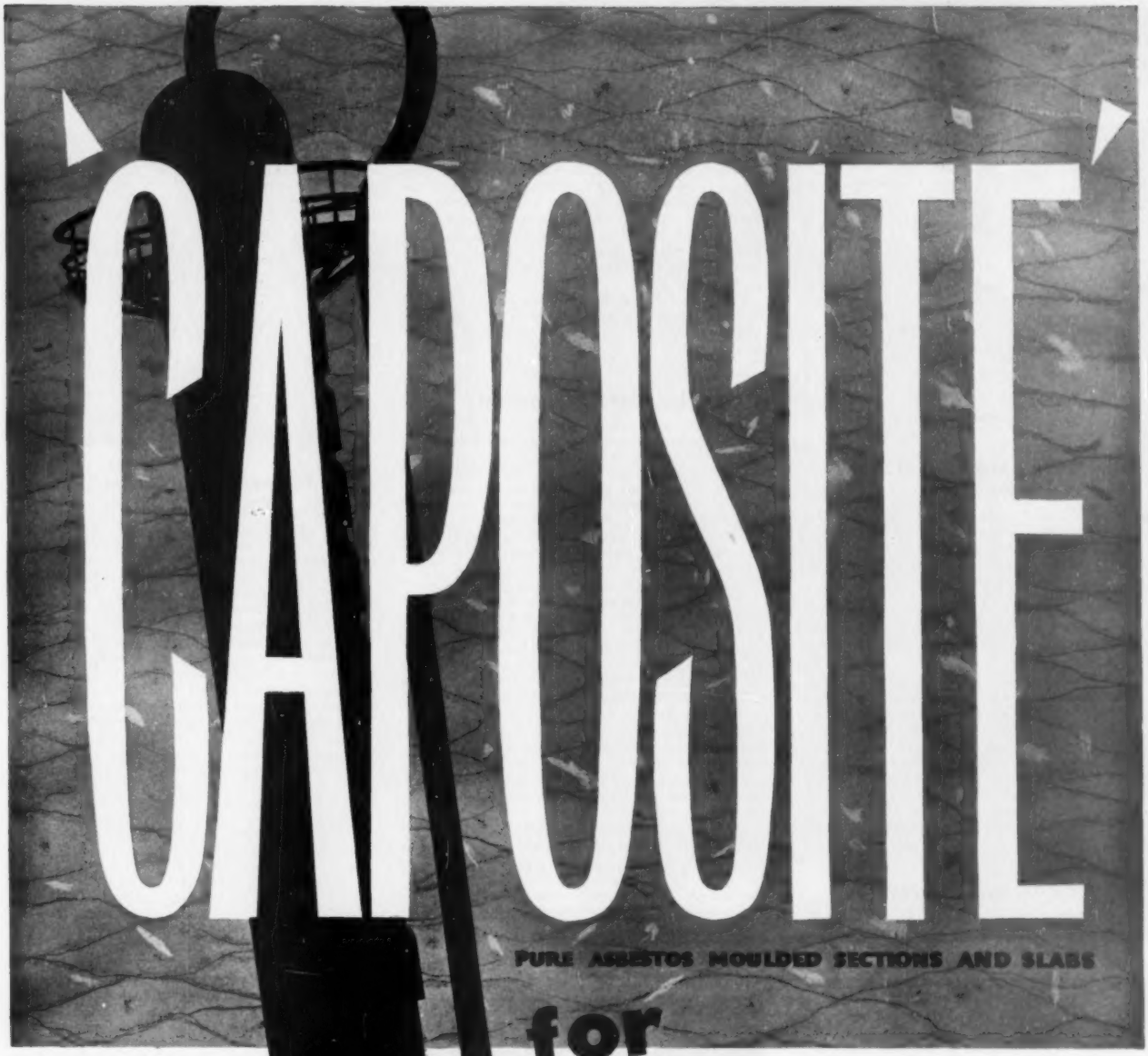
It is perhaps of interest to note that the same objections and fears which were previously raised in connection with an international oil agreement were also voiced at the time when the Interstate Oil Compact was first established in the United States. Since then the Compact has proved to be a signal success. A great deal could perhaps be learned from a study of its operations, and some of it may well be of relevance in a solution to the grave problems of foreign oil.

In this connection some recent actions of the Compact are of particular interest. The fact that the conservation of U. S. oil resources and the development of production and conservation in other countries of the Western Hemisphere are interdependent has influenced the Compact to invite as official observers to its meetings the United States of Venezuela, Mexico, and the Provinces of Alberta and Saskatchewan in Canada. These invited parties have responded most cooperatively.

This action of the U. S. Compact might perhaps, as a first step, point the way to a future Pan-American approach to the problems of Western Hemisphere oil. The Western Hemisphere countries are linked by close economic and political ties and by common strategy in their defense against aggression from the outside. Together with the industry they may find new ways to cooperate voluntarily and without coercion, within appropriate fields, on such matters as the establishment of those basic facts which are essential for the conservation, and thus for the development, of their oil resources. Such activities must for their effectiveness depend completely on enlightened knowledge and the compulsion of mutual self-interest. But if successful, a Pan-American approach to the problems of Western Hemisphere oil may well become one of the most important bases for the political and strategic solidarity of the Western Hemisphere.

Similarly, in the Eastern Hemisphere, any apparent conflicts of interest among producing countries, consuming countries and the operating companies are actually far outweighed by the real and permanent community of interest among all of them. The Schumann Plan for the establishment of a European Coal and Steel Community gives hope that it may also be possible to resolve other economic and political differences and conflicting interests and issues affecting Eastern Hemisphere countries. While the problems of Eastern Hemisphere oil are in many respects very different from those of European coal and steel, there is no doubt that these problems, too, can and must be resolved equitably and peacefully.

Once all sides clearly understand and appreciate their own as well as each others' problems, and provided there is good will on the part of all concerned, international oil, rather than leading to international frictions, should contribute to world understanding.



for

Refinery

Insulation

THE CAPE ASBESTOS COMPANY LIMITED · 114 · PARK STREET · LONDON · W · 1 · Grosvenor 6022

BRITISH OIL NEWS

By E. Lawson Lomax

New Motor Tanker for Hunting & Son Ltd.

The "Clydefield," a single screw motor driven oil tanker built by Harland & Wolff Ltd. at the Govan yard for Messrs. Hunting & Son Ltd. of Newcastle, was successfully launched on Sept. 16.

The principal dimensions are as follows:

Length between perpendiculars	515-feet 0-inches
Breadth moulded	70-feet 0-inches
Depth moulded	37-feet 9-inches
Deadweight (approx.)	16,500 tons

The propelling machinery consists of one single-acting Harland-B & W six-cylinder two-cycle engine of opposed piston design, with exhaust pistons controlled by eccentrics on the crankshaft. The bore of the main cylinders is 750 mm. and the combined stroke 2,000 mm. The engine is enclosed, force lubricated, direct reversing, and arranged for airless injections of fuel. It is coupled direct to the propeller shafting and maintains the requisite power at 120 rpm.

Jet Resistant Runways

The Shell Petroleum Co. Ltd. has developed a new jet-resistant asphalt carpet for airfields in its Thornton research laboratories. Heat from the exhausts of modern jet powered aircraft is so high during ground tests or at take-off that ordinary asphalt carpets are disintegrated, causing ugly scars or holes. The new carpet has been proved, by extensive tests in several countries, to be capable of standing up to the high temperatures of these exhausts.

Iraq Government Pipeline

Costain-John Brown Ltd. has been named consulting engineer for the new 135-mile 12-inch crude pipeline to be built from the Iraq Petroleum Company's main line system at K2 pumping station (Beiji) to the new Iraq government oil refinery to be built at Daura W. Bagdad. M. W. Kellogg Co. is in charge of engineering the refinery construction, tenders for the civil engineering work in connection with it having just been called for.

Motor Trucks for the Middle East

Leyland Motors Ltd. announces that a fleet of 63 Leyland trucks, comprising dumpers, self-loading machines and water tankers, has been ordered for shipment to the Middle East. The trucks have specialized equipment to handle heavy machinery oil pipes, rock dumping and off-loading at the docks, and some are dual-purpose tractor vehicles which can be hitched to truck or bus semi-trailers. This order is valued at about £250,000.

Caltex Tanker Launched

Month by month the British tanker fleet continues to grow. Latest launching was that of the *Caltex Canberra* on Oct. 20, built for Overseas Tankships (U.K.) Ltd. at the Haverton Hill shipyard of The Furness Shipbuilding Co. Ltd. She is the first of two vessels to be built for the same owners and is the 135th tanker to be built at Haverton Hill.

Caltex Canberra is a single screw, turbine driven ship of 544 feet overall length, a deadweight of 17,100 tons and a speed of about 15 knots.

Llandarcy Expansion

The fifth and last of the new jetties serving the Anglo-Iranian Oil Co.'s Llandarcy refinery in Wales has now been completed.

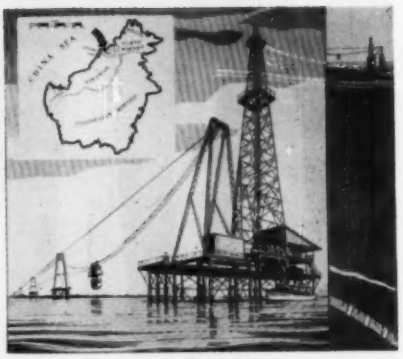
All five jetties are made of spun concrete to defeat the Toredo mollusk, which undermined the original pre-war wooden ones. Five 28,000 dwt tankers can now be discharged simultaneously. These improvements have been made necessary by the large-scale post war development, which has raised the throughput from 360,000 tons to 4,000,000 tons per year.

One of Llandarcy's major productions is motor spirit, of which the current output is 500,000 gallons per day. When the new catalytic cracker comes on stream this will be increased by 50 percent. This plant was scheduled for completion by the end of November. Catalyst is already being loaded into storage and the main plant has been assembled.

To accommodate the increased output of the refinery, new tankage and pipelines are being built at the refinery, the tank farm and docks, while a considerable volume of small tankage is being erected for the storage and handling of lubricating oils.

The new autofining unit, which employs a catalytic process for the removal of sulfur compounds from oil during refining which has been developed by A.I.O.C., has achieved design capacity in throughput and desulfurization efficiency on motor spirits, and is now successfully processing tractor vaporizing oil. It has a capacity of 5,000 gallons per hour on white spirit or tractor vaporizing oil and cost about £250,000 to install.

Hoisting into position the piping sections of the new 250-foot flare stack at AIOC's Llandarcy refinery which will burn off waste gases from the catalytic cracking plant.



Submarine Drilling At Seria

Underwater drilling, said to be the first on any considerable scale in the British Commonwealth, is being undertaken by Shell in an effort to locate an offshore extension of the Seria oil field, now producing at the rate of over 100,000 barrels daily. Drilling will be conducted from a platform of tubular steel set on the bed of the South China sea. From this one platform four wells can be put down by directional drilling.

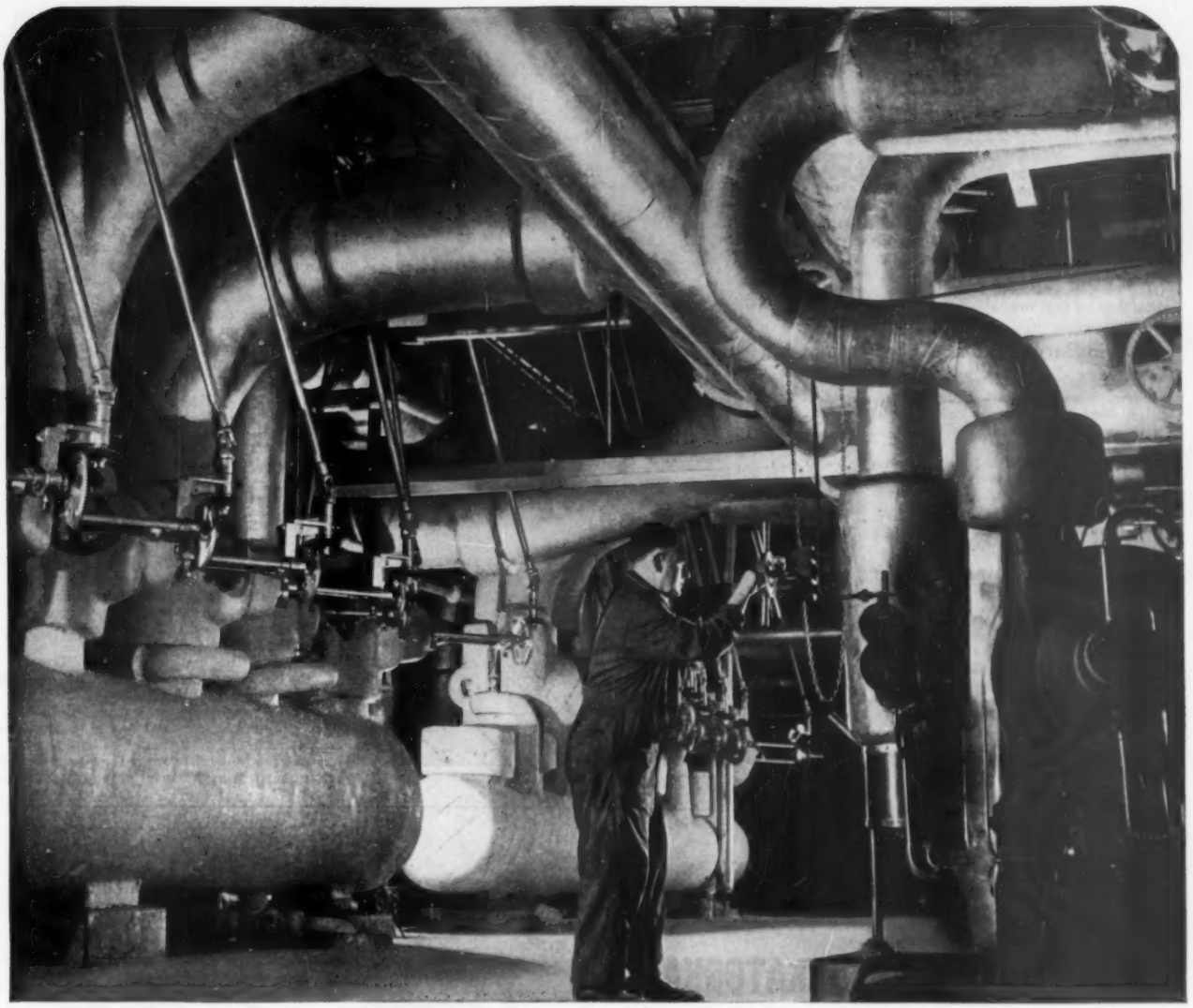
The setting-up of a platform sufficiently rigid to permit drilling to proceed posed one problem. A second and even more formidable problem was to provide access to the platform itself during the long spells of stormy weather encountered in the South China Sea. Since vessels cannot be brought alongside on account of the heavy swell experienced in this region for most of the year, a solution was found in the construction of an aerial ropeway linking the drilling platform with the shore. By this means constant communication can be maintained with the platform which has been specially constructed to accommodate all the equipment required for drilling.

The long span of the aerial ropeway connecting the drilling platform to the shore made it necessary to place intermediate structures on the sea bed at 840-foot intervals. these structures being supported on smaller jackets of a type similar to those employed for the main drilling platform, each being securely anchored by four bearing piles. These aerial ropeway jackets were fabricated ashore and taken out on barges to the locations and placed into position by means of a heavy lift crane, the steel structure afterwards being erected at site on top of the jackets. Lifts up to five tons for materials and equipment can be handled over the ropeway and a transporter car for personnel has also been provided.

Book Review

Review of Petroleum Technology, Vol. 12 (Covering 1950). Published 1952 by the Institute of Petroleum, 26 Portland Place, London W.7, England. 513 Pages, £2-10-0.

The 12th volume of this annual review compiled by 40 specialists in the various fields of petroleum technology and edited by F. H. Garner, E. B. Evans, and George Sell, reviews the substance of more than 3,300 individual papers, books, and patents that were published in 1950, with a few previously unnoted in 1948 and 1949. All the recognized branches of the industry are represented: petroleum geology, general geology (including U.S.A.), geophysics, drilling production, refining, cracking and other processes, refinery plant and engineering, analysis and testing, natural gas and helium, gasoline, oil fuels, lubricants, special products, oils from coal, shale and other materials, corrosion, engines and automotive equipment, all fully indexed. Brief appendices give accounts of British petroleum legislation and production and refining statistics.



Boiler feed pumps and steam receivers in one of Anglo-Iranian's four refineries in Great Britain.

ANGLO-IRANIAN OIL COMPANY, LTD. with its subsidiary and associated concerns, is one of the largest oil companies in the world.

Its principal sources of crude oil production are in the Middle East. Through its prospecting subsidiary, the D'Arcy Exploration Company, it is interested in oil-bearing territories in many other parts of the world.

The Company operates refineries in Great Britain, France, Belgium, Germany, Italy, Israel and Australia. Distribution and marketing of oil products are effected both by the Company itself and through various associated companies throughout the world. For sea transport its shipping subsidiary, the British Tanker Company, operates one of the largest fleets of ocean-going tankers. The Company's principal research establishments are in Great Britain, at Sunbury in Middlesex, and at Kirklington in Nottinghamshire.

THE BP SHIELD IS THE SYMBOL OF BP THE WORLD-WIDE ORGANISATION OF

Anglo-Iranian Oil Company

LIMITED

REPRESENTATIVE IN U.S.A.: W. D. HEATHEVES, 610 FIFTH AVENUE, NEW YORK 20, N.Y.

D. Brook-Hart Company Formed

Denys Brook-Hart has resigned as director of public relations to Petrocarbon Ltd., Petrochemicals Ltd., and the Manchester Oil Refinery Ltd. group of companies in order to form his own company under the title The D. Brook-Hart Company. The new company will offer a comprehensive publicity service using all media. Among its clients are Manchester Oil Refinery Ltd. and Petrochemicals Ltd.

During World War II, Mr. Brook-Hart served in the Middle East and Europe in a special branch known as "Phantom." Among his many post-war activities, he has brought out a large number of publications, including the magazine "OIL," which has become well-known under his editorship as the journal of the M.O.R. group.

D. Brook-Hart

Twin Barge Launch At Bristol

Two new barges, the *Regent Swift* and *Regent Swallow*, were launched from Messrs. Charles Hill & Sons Ltd. Bristol Dockyards on Oct. 14. These are the 11th and 12th barges to join the fleet which carries Regent Petroleum products between the ocean installation at Avonmouth and depots on the River Severn. Range of the barge fleet has now been extended to include the feeding of the company's West Wales depots at Swansea and Cardiff.

Eagle Oil & Shipping Company, Ltd.

On Sept. 15, H. W. Sansom resigned as manager of the shipping department of Eagle Oil & Shipping Co. Ltd. in order to take up an important post abroad. He was succeeded by S. G. Read, who has been assistant manager since February, 1951.

Mr. Read joined the transportation department of Anglo-Mexican Petroleum Co., Ltd. in December, 1924. He has been closely connected with the administrative side of the company's marine activities and is a Fellow of the Institute of Chartered Shipbrokers.

S. G. Read

Submarine Line Delivers LPG in Venezuela

Liquefied petroleum gas is being pumped through submarine discharge lines for the first time in history as part of a scheme to improve the supply of this important fuel to Caracas, capital of Venezuela.

The product, in this case propane, is shipped in bulk by tanker from Shell's Cardon refinery on the Paraguana peninsula to a 140-ton capacity storage installation at Catia de la Mar, about 10 miles from Caracas. Here the cargo is discharged through a 4-inch diameter submarine pipeline, about a quarter of a mile long. Water is pumped through a second pipeline into the cargo tanks of the tankers and so "pushes" the liquid propane out through the discharge line to the storage tanks on shore. An automatic water separator prevents the discharge water from passing through to the storage tanks.

From Catia de la Mar, the liquid gas is pumped through a 10½-mile, 8-inch diameter products pipeline to a storage installation at Caracas which has a total capacity of 280 tons. Here facilities have been installed for "bottling" the propane in cylinders.

Caltex Canberra Launched

The *Caltex Canberra* has been launched by Overseas Tankship (U.K.) Ltd., Caltex group affiliate, as the sixth in the company's program of tanker construction in the United Kingdom, a prime marketing area of Caltex, in partnership with Trinidad Leaseholds Ltd. and the Regent Oil Company Ltd.

Sponsor of the new tanker was Mrs. W. H. Pinckard, wife of the chairman of California Texas Oil Company Ltd.

The *Canberra*, built by Furness Shipbuilding Co. of England, is 544 feet 4 inches in length, and has a deadweight tonnage of approximately 17,250. The vessel is powered by a gear-driven turbine and will have a trial speed of 15 knots.

Descale WITHOUT Danger

SKATOSKALO

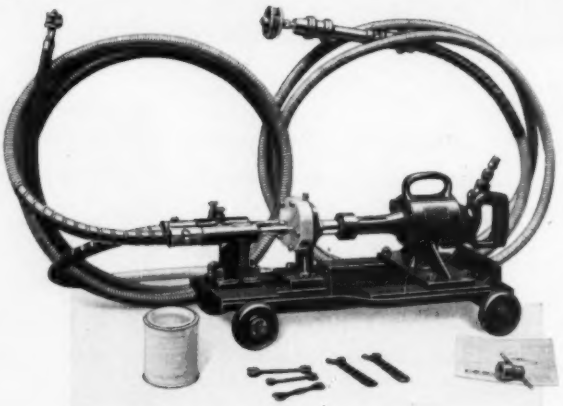
Use AIR-DRIVEN "SKATOSKALO"

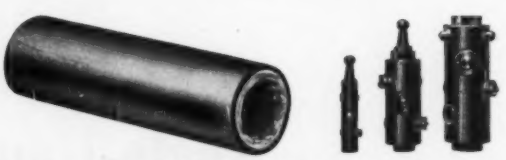
THE Air Motor "Skatoskalo" Set enables the operators to descale and clean tubes in the shortest possible time with the greatest efficiency. The air motor gives more horse-power and does not stall when heavy deposit is encountered.

The Air Motor Driven Set incorporates all the advantages of a Rotary Air Tool without sacrificing the advantages of the electrically-driven Flexible Drive type.

"Skatoskalo" equipment can be used with complete safety and is recommended for the efficient maintenance of cracking plant, boilers, evaporators, condensers, heat exchangers, etc.

Tubes of ⅝" internal dia. upwards can be thoroughly cleaned by "Skatoskalo" Air Tools.





Flexible Drives (Gilmans) LTD.

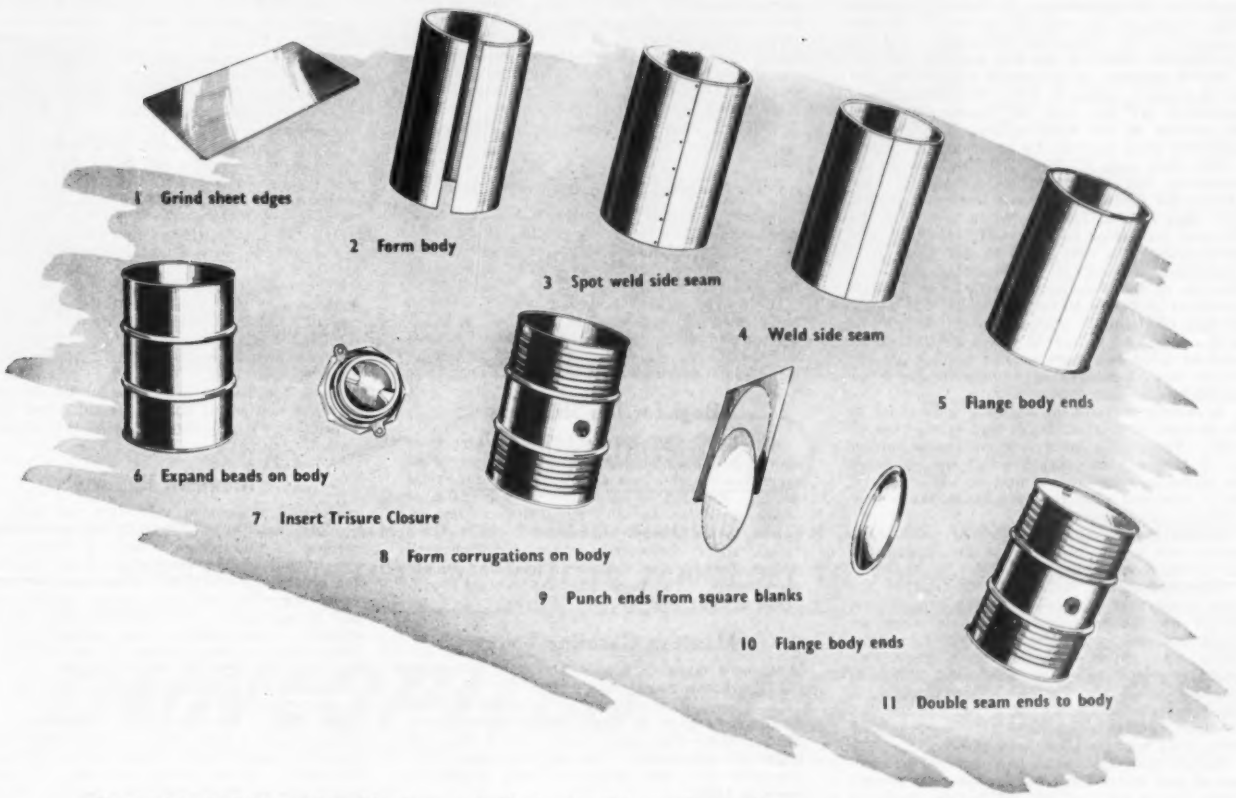
INCORPORATING F. GILMAN (B.S.T.) LTD.

Representatives in all parts of the United Kingdom. Principal agents in over sixty countries throughout the world.

195 HIGH STREET, SMETHWICK 41
STAFFORDSHIRE, ENGLAND

Please write for Catalogue WP stating your requirements.

TEAM WORK MAKES THIS A WINNING ELEVEN


1 Grind sheet edges
2 Form body
3 Spot weld side seam
4 Weld side seam
5 Flange body ends
6 Expand beads on body
7 Insert Trisure Closure
8 Form corrugations on body
9 Punch ends from square blanks
10 Flange body ends
11 Double seam ends to body

We consistently field an unbeatable eleven to tackle the essential operations in drum manufacture. Over 40 years' experience lies behind the design and production of our teams of drum making plant. If you feel that the time has now come for you to produce your own drums, instead of buying finished drums to your specifications, we should be pleased to advise you and to supply the most economical plant for the job. In short, if you wish to play at home, we can arrange a fixture on your own ground.

AGENTS IN U.S.A.: M. Neumunz & Son Incorporated, 90 West Street, New York 6, New York

AGENTS IN CANADA: Dominion Welders & Machinery Ltd., 322 Lumsden Avenue, Toronto 13

LONDON OFFICE: Abbey House, 2/8 Victoria Street, Westminster, London, S.W.1, England. Cables: Moonbro, Sowest, London, England

MOON

Regd. Trade Mark

MOON BROTHERS LIMITED, BEAUFORT ROAD, BIRKENHEAD, ENGLAND

Cables: "Moonbro" Birkenhead, England

MAKERS OF TIN BOX AND DRUM MAKING MACHINERY

dm ME 46

INTERNATIONAL NEWS AND NOTES

BCO May Quit Venezuela

British Controlled Oilfields, Ltd. has been seeking a partner in its Venezuelan operations, or a buyer for its concessions. If these negotiations fail, it may be necessary to surrender the concessions to the Venezuelan government and sell the tangible assets at the best possible price.

BCO's position in Venezuela was badly hurt by three main causes in 1951: the drilling of an expensive dry deep test, the dismissal of about 40 percent of the total working force, and a collective wage increase by governmental decree.

The deep test, El Mene-EM-285, was an attempt to find in Falcon state, east of Lake Maracaibo, prolific Cretaceous limestone production such as that encountered in the Mara, La Paz and Concepcion fields west of Lake Maracaibo since 1945. The hole failed to find deep oil in commercial quantities. Subsequently, a zone at the top of the Eocene, at which horizon oil is produced in BCO's Media field wells, was tested. In spite of attractive prospects on the electric log, only water and traces of gas were found. A zone at 3,500 feet gave similar results and the whole was abandoned at a total depth below 15,000 feet, in June 1951.

A drastic curtailment of labor amounting to 40 percent of total strength was carried out in 1951. Venezuelan labor law entitles a worker to 15 days pay for each year of service, when he leaves a company voluntarily. However, if he is dismissed without giving cause, the indemnities become roughly triple.

British Controlled's retrenchment policy as a result was costly, resulting in an expenditure for indemnities of about $125,000.

Nevertheless, oil revenue at the end of the year would have exceeded operating expenditure, except for the compulsory collective wage increase imposed by governmental decree in April 1951. The government intervened when prolonged negotiations between producing companies and their workmen had led to no results. It has been estimated that the direct and indirect benefits granted by the April decree increased labor costs between 10 and 15 percent.

British Controlled, which has produced an average of just under 1,000 b/d for the past several years, had a yield of 346,333 barrels from its three fields in Venezuela during 1951. El Mene field produced 135,947 barrels as against 148,819 in 1950, due to natural decline. Two wells were deepened slightly, but such technical difficulties were encountered due to the poor mechanical condition of these old wells that it was decided to drill replacement wells in the future.

Media field, which produced nothing in 1950, yielded 15,225 barrels in 1951. Two dead wells were cleaned out and put on the pump.

Hombre Pintado produced 195,161 barrels in 1951, a decrease of 19,187 barrels as compared with 1950. One well completed in early 1951 was a failure. A second one, completed in November, was making an average of 50 b/d in December.

Texas Petroleum Co. drilled two wells in areas in which British Controlled has an interest, but neither was productive.

With the object of enhancing the attractiveness of the Venezuelan asset for either a partner or a buyer, British Controlled applied last November for new concessions, as did other operators, at the invitation of the Venezuelan government. No new concessions have, however, been granted to date.

New Mexican Line Completed

The 190-kilometer long oil pipeline from the Salamanca refinery in the State of Guanajuato to Lagos de Moreno, which was constructed in the record time of 90 days at a cost of 10 million pesos, began operations Nov. 15, it was announced in Mexico City by Senator Antonio J. Bermudez, director-general of Petroleos Mexicanos.

Century Opens New Office

An office to handle Canadian sales and service of geophysical equipment has been opened in Calgary, according to Opie Dimmick, president, Century Geophysical Corp., Tulsa. The new office is under the direction of H. B. Munsey, formerly supervisor of production and coordinator of customer service at Century's Tulsa plant. Earlier this year Century Geophysical Corporation of Canada, a wholly-owned subsidiary, was organized in Calgary. James K. Ziegler is vice president in charge of the Canadian corporation.

To Expand B-A Clarkson Plant

British American Oil Company Ltd. will build an $8 million addition to its refinery at Clarkson, Ontario. A catalytic cracking unit, catalytic polymerization unit, gas concentration and other facilities will be installed.

Within the past three years British American has opened "cat crackers" at Montreal East, Edmonton and Moose Jaw. The addition at Clarkson will be the fourth major expansion at British American refineries within a five-year period.

Bags for Tar Shipping

A German manufacturer has developed a specially impregnated bag for the shipment of tars, resins and waxes as a substitute for metal drums. Products to be shipped may be filled at temperatures up to 480° F. The bags are reported to be cheaper than drums and to save freight costs. Less space is occupied than with drums for marine shipments and in storage warehouses. The bags may be decorated with brand designs and printed.

Mexican Gasoline Taxes

Mexico's taxes on domestic gasoline consumption produced more than 140,000,000 pesos in 1951, it was disclosed by Carlos Villela M. in a lecture presented at the National Engineering School under the sponsorship of the Mexican Highway Association. The engineer added this compares with tax returns of only 13,000,000 pesos in 1935.

Kuwait Production

Production of crude oil in Kuwait during the month of September is reported as 3,011,285 tons (roundly 752,820 barrels daily). Production for the nine months ending Sept. 30 was 27,671,872 tons (roundly 760,000 barrels daily).

Brazilian Oil Bill

The Petroleum Bill passed the first and second debates in the Chamber of Deputies in September and is now being drawn up in its final form for submission to the Senate. The principle of a state monopoly has been definitely adopted, the monopoly to be exercised through the Petroleum Council, the share society "Petrobras" and its subsidiaries. Activities included in the monopoly are: prospecting and exploitation, the refining of national or foreign petroleum, and transportation by water or pipe line.

More than a score of amendments were presented after the first debate, necessitating the return of the bill to the Commissions, and at least two of those previously accepted were subsequently modified. The situation has become so confused that it is difficult to say which amendments have been approved until the final draft is published.

The authoritative *Jornal do Commercio*, commenting on the bill in its present form, remarks that the Leader of the Majority, with the innumerable concessions he was obliged to make, has not retained the bases of the mixed society. That which the Chamber has approved is something almost entirely new, and not only new, but confused.

The project has not yet reached the Senate and considerable doubt is expressed as to whether it will be dealt with during the present legislative session, which ends on Dec. 15. The Lower Chamber is now putting the final touches to the 1953 Budget Law. When this passes to the Senate, it will leave little time for the discussion of other matters if it is to be submitted to the President for sanction within the statutory period.

Mexican Exports

Mexico's exports of petroleum and petroleum products reached 301,100,000 pesos last year, according to the General Statistics Bureau. The government agency reported this figure continued the general upward trend of the past five years, which began in 1947 with exports worth 45,400,000 pesos, soared to 248,700,000 pesos in 1948, dipped to 131,800,000 in the exception year of 1949, but came back strongly in the following 12 months to bring in 273,600,000 pesos.

Pemex total export income for the five-year period amounted to 1,103,300,000 pesos.

The bureau observed that crude topped all exports with a total value of 465,700,000 pesos, followed respectively by diesel and fuel oil worth 341,500,000 pesos; crude kerosine, 73,500,000 pesos; gas oil, 66,800,000; crude gasoline, 27,200,000; refined gasoline, 26,000,000; asphalt, 3,500,000; diaphanous petroleum, 1,700,000; and paraffin, 1,000,000.

Combined foreign sales of natural gas, unspecified gaseous fuels, lubricating oils and greases, benzol, naphthalin and miscellaneous products amounted to less than 1,000,000 pesos in the last five years.

These Y.P.F. officials in Buenos Aires were among the many Latin American government leaders and oil executives who received personal invitations to attend the International Petroleum Exposition, May 14-23, 1953, in Tulsa, Okla. The Y.P.F. group includes: (left to right) seated, I. J. Tietelbaum, chief of drilling department; Dr. Altavino Catinari, inspector of geological work; Dr. J. J. Zunino, chief of geological department; Jose M. Messone, chief of production department; Socrates Broullon, general superintendent of production; standing, Rodolfo Martin, chief of geophysical department; J. Inigo, assistant chief of drilling department; Blas Berardinelly, chief of gas services and distribution.

Three Famous names in Transport–

A Thornycroft petrol engined "STURDY STAR" pumping unit, coupled to a 1,500 gallon capacity semi-trailer, refuelling B.O.A.C.'s record breaking "Comet".

Two Thornycroft fuellers can normally refuel the "Comet" with 3,000 gallons in less than 10 minutes.

B·O·A·C THORNYCROFT SHELL

JOHN I. THORNYCROFT & CO., LIMITED, THORNYCROFT HOUSE, SMITH SQUARE, LONDON S.W.1., ENGLAND.

SPECIALIST SUPPLIERS OF WHEELED TRANSPORT TO THE OIL INDUSTRY

DUNLOPILLO COMFORT

for the British Malayan Petroleum Company in Borneo

These attractive bungalows, built for the British Malayan Petroleum Co. Ltd. in Borneo, are designed to give its senior officials every comfort that modern industry can provide.

Dunlopillo mattresses and cushions are a natural choice, for even in this hot climate the millions of inter-connected air cells in the Dunlopillo keep it air conditioned and cool in use. Furthermore, Dunlopillo is germ and vermin resistant and cannot create dust. It is light to handle and labour saving, for it never needs turning or shaking.

All these advantages — already well known to British Malayan — are now personally enjoyed by their senior officials at the Seria Oilfields.

A senior staff bungalow at the Seria oilfields of the British Malayan Petroleum Co. Ltd. (an Associate Company of Shell)

DUNLOPILLO

Dunlop Rubber Co. Ltd. (Dunlopillo Division), Walton, Liverpool, England
Associated Companies and Distributors throughout the world

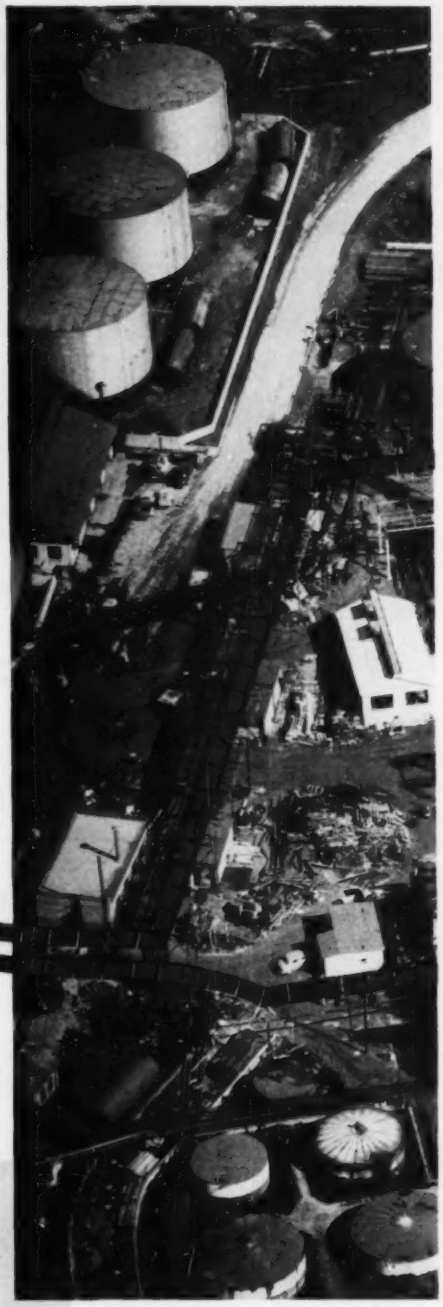
10 042

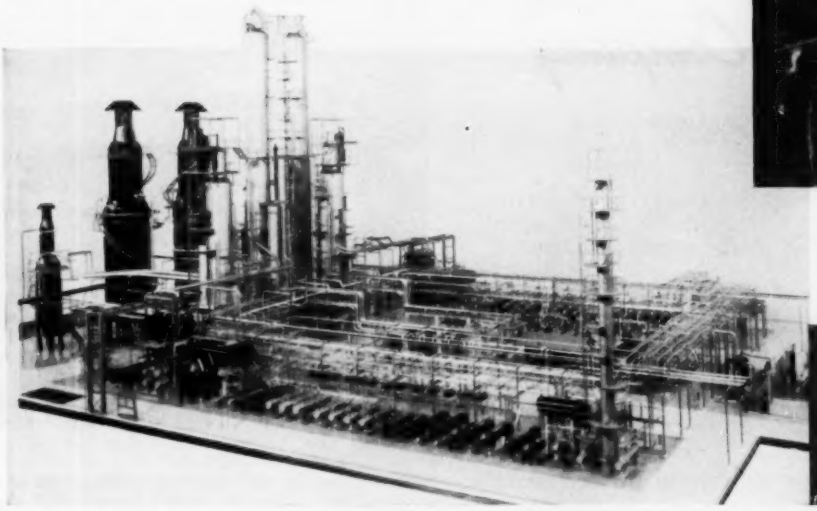
REFINERY *through a* NEEDLE'S EYE

HUNDREDS of tons of material and equipment for this 50,000-barrel twin distillation unit had to be brought in "through a needle's eye." Only one narrow avenue of access was open during much of the construction time and the unit itself occupied practically all of the site leaving very little elbow room for maneuvering equipment or for storage of materials.

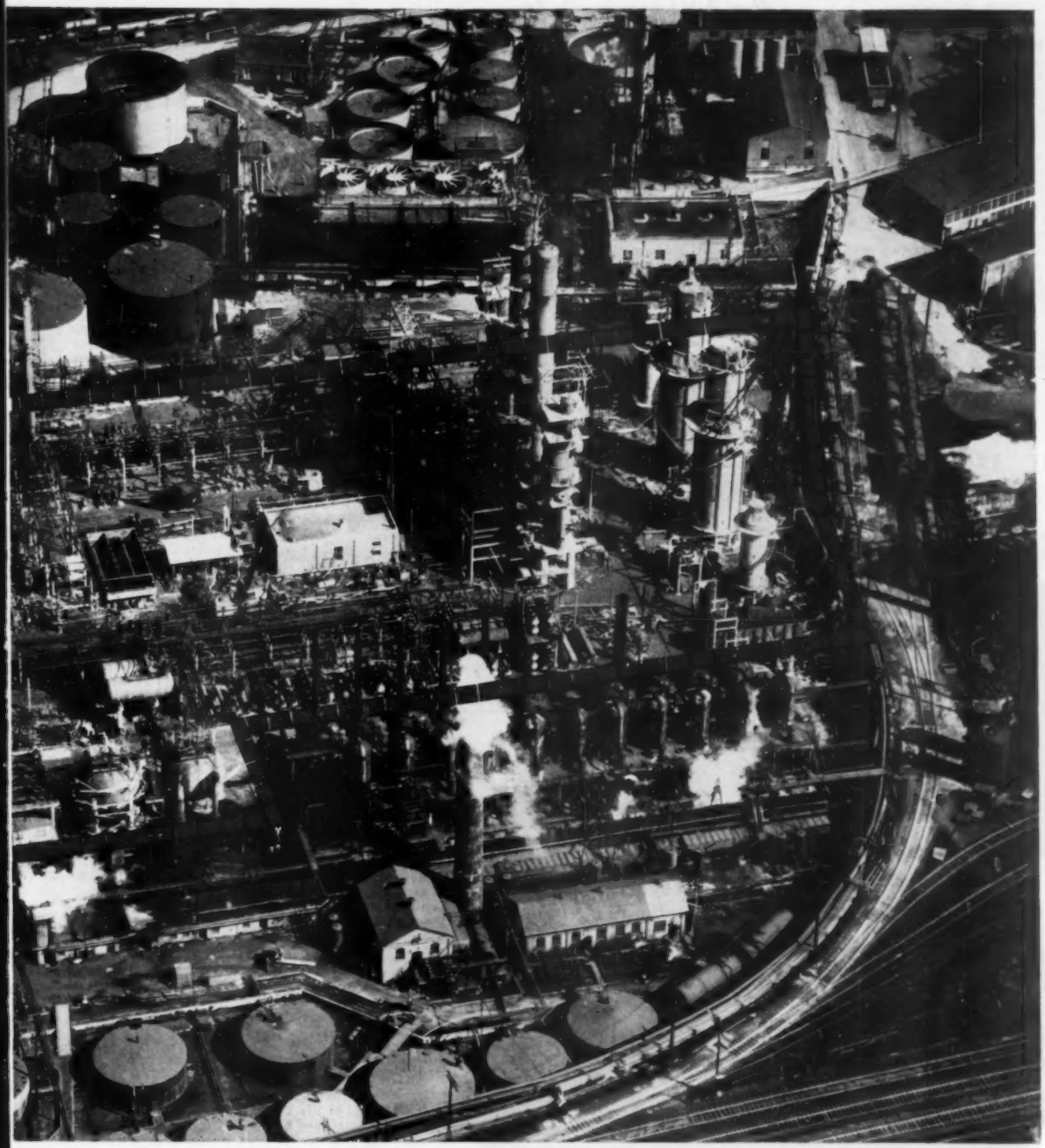
These conditions demanded precise timing of the arrival of materials and equipment and rigid adherence to a carefully planned construction schedule.

The twin unit was recently completed for The Standard Oil Company of Ohio on the original site of their No. 1 Refinery in Cleveland. It is operating successfully today—another proof that ***McKee Engineering means assured results.***





This scale model of the unit helped check engineering and speed construction. It is a valuable aid in training operating and maintenance crews.



DESIGN, ENGINEERING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

McKee Engineering

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio.
New York Office: 30 Rockefeller Plaza, New York 20, N.Y. • ***Washington Office:*** 1587 M Street, N. W. Washington, D. C. • ***England:*** The Iron and Steel Division of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd.
District Engineering Offices: Union, New Jersey and Tulsa, Oklahoma.

Plan Washington Refinery

General Petroleum Corp. will build a $35 million refinery in the Pacific Northwest to refine Canadian crude oil brought by the Trans Mountain pipe line from Alberta. The plant will be located on an 850-acre site facing Puget Sound near Ferndale, 12 miles south of the border.

Engineering, designing and construction of the refinery will be in charge of the Bechtel Corp. The refinery will process 35,000 barrels daily. The processing facilities will consist of one primary distillation unit, a gasoline reformer, a TCC catalytic cracking unit, a thermal cracking unit with a vacuum distillation tower, and a catalytic polymerization unit.

Storage facilities will be sufficient for two million barrels of crude oil and products. Docking facilities capable of handling barges and large ocean-going tankers will be erected.

New Bethlehem Supply Store

Bethlehem Supply Co. has opened a store at Tioga, N. D. This new Bethlehem installation is the first major supply company store to locate in the theater of the activity in the Tioga-Beaver Lodge area of the Williston Basin. It will be under the supervision of E. S. Lewis, district manager at Casper, Wyo. D. B. Affack, formerly at Great Bend, Kansas, will be store manager.

Buys Old Ocean Properties

Oil and Gas Property Management, Inc., New York and Dallas, has bought the oil wells and leases in the Old Ocean Field, Matagorda County, Texas, formerly held by the Frank and George Frankel interests for a consideration of the order of $7 million. San Juan Oil Co., Dallas, will manage and operate the properties.

Evaporation Symposium

(Continued from page 52)

seeking to develop conservation methods and equipment is justified. The subcommittee prepared charts for calculating both breathing and filling losses for cone roof tanks.

The third section of the symposium was a practical review of what is currently known about evaporation from conservation-type tanks such as floating-roof, variable vapor space and low pressure storage. Presentation was by H. L. O'Brien of Graver Tank and Manufacturing Co. on behalf of the nine members of subcommittee "C" who prepared the data.

Although the primary reason for erecting conservation-type storage is to reduce filling and breathing losses, it was noted that collateral advantages may include decreased losses from fire and corrosion.

Based on the data developed by subcommittee "B" on cone-roof tankage, the "C" committee sought to determine not only when a cone or fixed roof tank should not be used, but also specifically what type of conservation tank should be used. It was pointed out that present conclusions are not the last word since present data are insufficient and out of date. Until added facts are gathered, the committee report is intended to serve as the best guide presently available.

The subcommittee reported that "in the case of the floating-roof tank, climatic factors should be given consideration since extremely cold weather and heavy snow will cause operating problems. The pan roof is particularly critical. Variable vapor-space tanks and low-pressure tanks are less affected by climatic conditions than are floating-roof tanks.

"The floating-roof tank is used for all volatile products which will not boil at storage temperatures, and is the most important conservation tank used for the storage of crude oil, although the breather-roof tank finds infrequent application for this latter purpose. The variable vapor-space tank is used almost entirely for motor and aviation-gasoline storage. The low pressure tank is usually used for products with vapor pressures too high to be stored in the other types of conservation tanks.

"In the case of motor gasolines and purely for purposes of general information, the following may serve as an approximate guide. We cannot overemphasize the necessity of making an analysis in each individual storage problem.

"In the range of zero to six turnovers, the variable vapor-space tank is usually preferred and recommended over the cone-roof tank. In the range of zero to three turnovers, this may involve a close decision; but, in the range of three to six turnovers, the conservation tank is usually indicated. In the range of six to 18 turnovers, either the variable vapor-space or the floating roof tank is recommended. The variable vapor-space tank is usually preferred in the range of six to ten turnovers, and the floating-roof tank in the range of 10 to 18 turnovers. The floating-roof tank is almost always preferred for more than 18 turnovers.

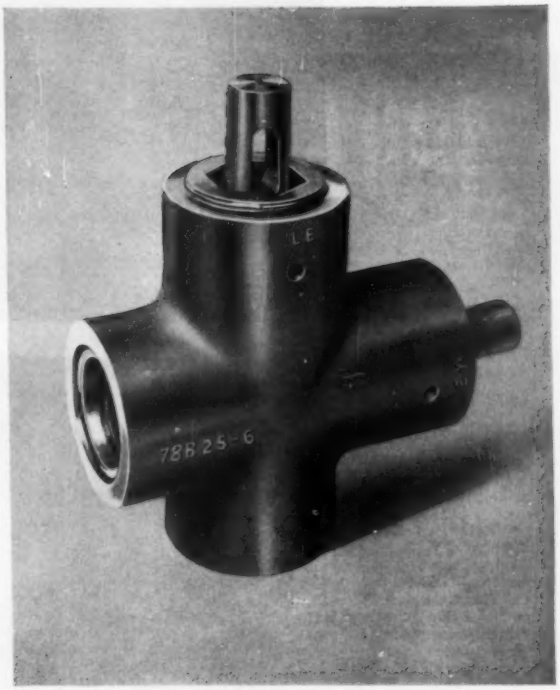
"The low-pressure tank is generally used in the same range of turnovers as the variable vapor-space tank, but is infrequently used in the case of motor gasolines because of its relatively high cost. For products of higher volatility, however, it may represent the only practical type of storage, and an example of this is natural gasoline, or crude oil to which natural gasoline has been added.

"It would be convenient and highly desirable if general rules could be established as a guide to indicate the proper use of cone-roof tanks, floating-roof tanks, low-pressure tanks, and variable vapor-space tanks. For this reason, the data indicated previously herein may be misleading in any specific case because of the many variables which must be considered," the committee concluded.

New Products Line

Salt Lake Pipe Line Co. will build a 140-mile products line from Pasco, Washington, to Spokane. Cost will be about $4.5 million. The 8-inch pipe will have a capacity of 12,000 b/d when completed in the middle of 1953.

FOR OIL REFINERY & CHEMICAL PLANTS



Corner Fitting — Type 7000

MILLENNIUM KEY

Millennium—Key Cast Steel Fittings

FOR STRENGTH & PRESSURE TIGHTNESS

Lake & Elliot Ltd.
BRAINTREE ENGLAND

L381RC

Topanol' is a registered trade name, the property of Imperial Chemical Industries Limited.

'TOPANOL' A antioxidant

(commercial 2 : 4 dimethyl 6 : *tert* butyl phenol)

FOR GASOLINES (leaded or unleaded) · **TRANSFORMER OILS**

PARAFFIN WAX · SHELLAC · TURBINE OILS, etc.

NOT FOR EDIBLE OILS

SUPPLIES AVAILABLE — *INFORMATION FROM*

ICI

IMPERIAL CHEMICAL INDUSTRIES LTD., LONDON, S.W.1.

B.A.2

OIL COMPANY STAFF CHANGES

WALLACE R. FINNEY, retiring pipe line advisor to Standard Oil Co. (N.J.), was honored by his fellow oilmen October 10th for his outstanding contribution to petroleum industry transportation. Mr. Finney retired October 1, bringing to an end an active career in oil which began in 1914.

The veteran oilman was honored at a luncheon held at the University Club under the sponsorship of P. C. Spencer, president, Sinclair Oil Corp., A. W. Peake, president, Standard Oil Co. (Ind.), and ex-Wyoming-ites who wished to salute Mr. Finney on the occasion of his retirement.

During his industry association, Mr. Finney had headed, been a director, or an advisor of numerous pipe line construction and operating organizations both in this country and overseas. He joined the Jersey company in 1932. He assisted in planning for the Trans-Arabian and other Middle East pipe lines, and during World War II headed the industry committee which supervised the design and construction of the Big and Little Inch emergency pipe lines.

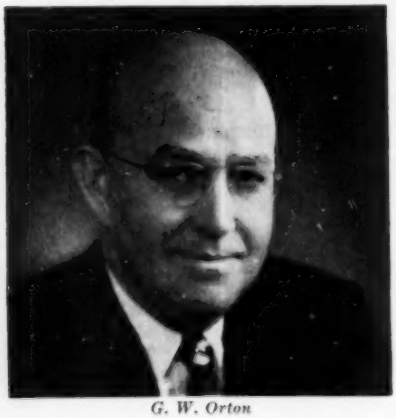
ROBERT L. BOGGS has been named assistant to K. C. Heald, vice president of the production department of Gulf Oil Corp. He has been manager of Western Hemisphere production operations at New York since 1951.

Mr. Boggs joined Gulf in the Tulsa production division as a district engineer in 1927, and a year later was transferred to Venezuela where he served in various capacities as production engineer, chief petroleum engineer, and executive assistant. In 1939 he was assigned to Caracas as assistant to the president of Mene Grande Oil Co. He became division manager of Mene Grande's eastern Venezuelan operations in 1947, and was elected vice president and director of Mene Grande in 1949.

GEORGE W. JANDACEK has joined the staff of the research and development department of Deep Rock Oil Corp. at Cushing, Okla. He will serve as a chemical engineer.

G. W. ORTON has been appointed resident director of affiliated companies in the United Kingdom by the California Texas Oil Company Ltd. Mr. Orton will coordinate the activities of Caltex' affiliated companies in England and will also serve as director of Regent Oil Company Ltd.

Mr. Orton joined the Caltex group of companies in 1952 after 24 years of experience in the oil industry, having joined The Texas Co. in August of 1928 at Houston. After World War II, he was active in foreign operations of The Texas Co., where he held the position of general manager of foreign operations until shortly before joining Caltex.



G. W. Orton

ERIC C. DRAKE, general manager of the Anglo-Iranian Oil Company's operations in Iraq and Iran during the last year's seizure of the company's properties in Iran, has succeeded W. D. Heath Eves in New York as Anglo-Iranian's United States representative on Dec. 1. Mr. Eves, who is resigning from the company, took up his present New York appointment in November 1949, after having been deputy representative for nearly 18 months.

Mr. Drake joined Anglo-Iranian in 1935 and served the company in various Middle Eastern countries for 14 years. He is an honors graduate of Cambridge University.

M. E. HANKINS has been appointed divisional purchasing agent of The Texas Co. at New York to succeed F. G. Shlemmer, resigned. Mr. Hankins was formerly divisional purchasing agent at Chicago. E. C. Borg, divisional purchasing agent, Los Angeles, has been transferred to Chicago to succeed Mr. Hankins, and Philip Hauck becomes divisional purchasing agent, Los Angeles.

ROBERT J. BRADLEY of Dallas, Texas, has been elected president and a director of Mazda Oil Corp., a subsidiary of National Phoenix Industries. Mr. Bradley is also president of San Juan Oil Co. which manages and operates property in the Mid-Continent area. He formerly was with DeGolyer and MacNaughton, nationally known consulting firm of Dallas, in charge of petroleum economics. He is also a director of Halliburton Oil Well Cementing Co. and a director of the San Juan Oil Co.

BRONCE L. RAY, assistant general manager of marketing, has been elected a director of Esso Standard Oil Co. He joined the company in the Virginia division 30 years ago and rose from general salesman through various district and sales management positions.

DR. WILLIAM J. McGILL, assistant general manager of manufacturing of Standard Oil Co. (Ind.), has been appointed general manager of industrial and public relations. He will also co-ordinate related activities of the advertising department of the company. He will report directly to the chairman of the board and attend management conferences.

The functions of the departments involved and their present direction remain unchanged. Herman L. Boyle continues as director of industrial relations and Conger Reynolds as director of public relations.

RICHARD T. LYONS of Houston has been elected president of Union Sulphur and Oil Corp. effective Nov. 1. He succeeds Herman F. Whiton, company chairman. Mr. Whiton will continue active in the company. Mr. Lyons has been vice president in charge of exploration in the mid-continent division of Tide Water Associated Oil Co. for the past 16 years. Previously he was vice president and director of Skelly Oil Co.

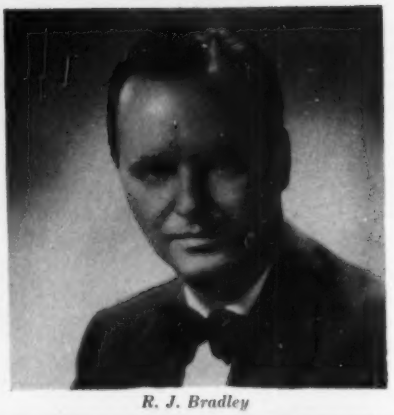
JACK A. VICKERS, JR., 27-year-old son of the founder of the Vickers Petroleum Co., became president of that company on Nov. 10. He succeeded John S. Wertz, president for the past four years, who has been elected chairman. James B. Smith, who has been vice-president and a director since 1941, became executive vice-president.

Mr. Vickers has been with the company since 1946, when he started in the scouting end of the business.

Mr. Wertz served the company as secretary and treasurer for 26 years and has been president for four years.

Mr. Smith came to Vickers as sales manager from Skelly Oil Co. in 1937 after 11 years with that concern.

E. C. Drake

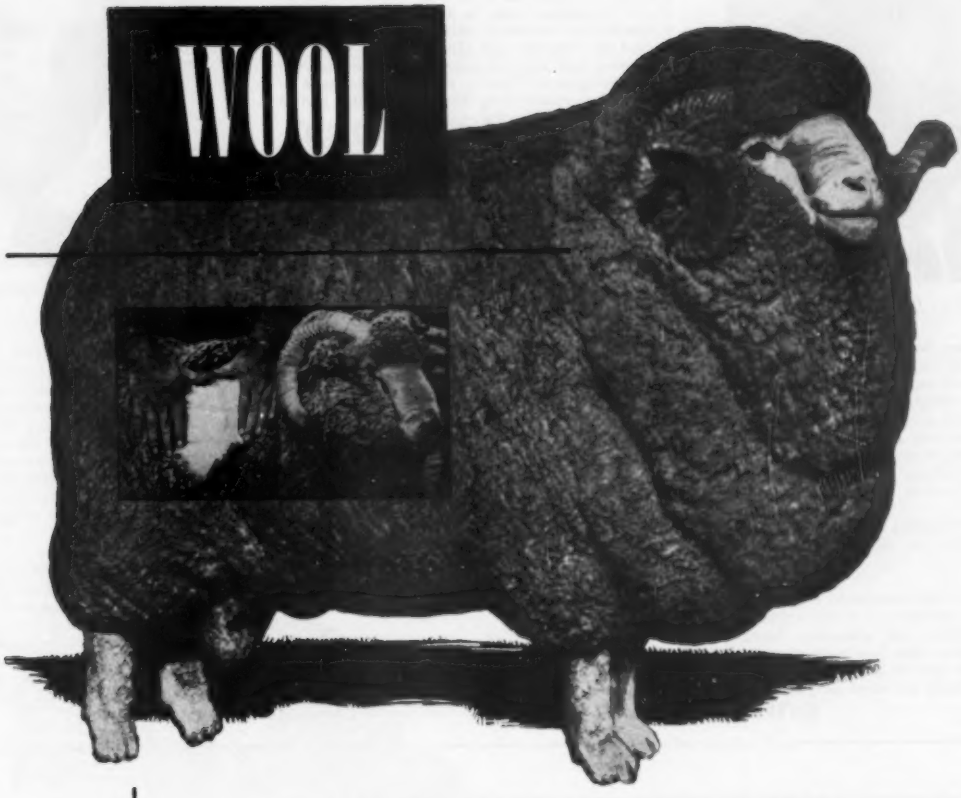


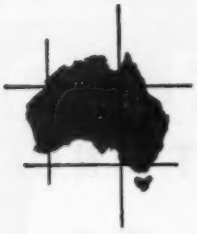
R. J. Bradley

Dr. W. J. McGill

J. A. Vickers, Jr.

WOOL





wealth of the Commonwealth

Throughout the world
WOOL means **warmth**...
protection and
comfort for
man, woman, child.

And, throughout the world,
AUSTRALIAN WOOL
means **fine** wool...
soft, fleecy, **quality** wool.

Australia's
112-million sheep
today provide
1 out of every 4 pounds
of the world's supply...
more than half
of all the top-quality
Merino wool.

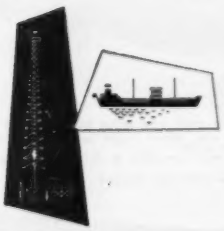
Wool is **one-third**
of Australia's
total export trade...
accounts for **one-tenth**
of the national income.

Another mighty important
commodity
to Australians is
OIL...

The petroleum products
which have aided
industrial expansion...
which give power,
light, warmth...
which fuel and lubricate
all manner of
modern transport.

More than a **billion**
imperial gallons
of oil products
each year
are the **life-blood**
in the arteries of
the Australian Commonwealth...
are helping to build
a stronger nation...
a better way of life
for the Australian people.

In Australia, as elsewhere
in the Eastern Hemisphere,
people know
they can depend on
the Stanvac organization
to supply this vital oil.



STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

26 BROADWAY, NEW YORK 4, N.Y.

AUSTRALIA • BURMA • CEYLON • HONG KONG • INDIA • INDO-CHINA • INDONESIA • JAPAN • KENYA • MADAGASCAR
MALAYA • NEW ZEALAND • PAKISTAN • PHILIPPINES • PORTUGUESE EAST AFRICA • RHODESIA • SINGAPORE
SOUTH PACIFIC ISLANDS • SOUTH WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

T. L. Lenzen

T. L. LENZEN has been elected a vice president of Standard Oil Co. of Calif. He has been manager of Standard's eastern hemisphere operations and has been closely affiliated with Middle East Oil developments since 1938. He has spent considerable time abroad as coordinator in the administration of Standard's interest in the affiliated producing, refining, transportation and marketing companies doing business in the Eastern Hemisphere.

He is a director of Bahrein Petroleum Co., Ltd., California Texas Oil Co., Ltd. and Overseas Tankship Corp.

C. B. WENTZ has been promoted to the newly created position of manager of Continental Oil Company's coordinating and planning department. P. N. Colliston, who has been proration engineer in southern and southwestern regions, will succeed Mr. Wentz as chief proration engineer.

D. S. SIMMONS has been appointed assistant general manager of the manufacturing department of Imperial Oil Ltd. to succeed J. K. Jamieson who has become a director. He formerly was general superintendent of Montreal East refinery. Mr. Simmons has been with Imperial for 20 years. He worked in the engineering department at Sarnia until 1943 when he was loaned to the St. Clair Processing Corp. to assist in the wartime production of synthetic rubber. In 1946 he returned to Imperial and the following year was appointed assistant manager of the engineering and development division, becoming manager in 1950. He transferred to Montreal in 1951 and to his present position this spring.

DWIGHT P. BAILEY has been appointed assistant industrial products sales manager of the eastern division of the Tide Water Associated Oil Co. and Wilfrid S. Fenton industrial sales manager of the New York sales department. Mr. Bailey, who joined the company in 1930, was formerly industrial products sales manager of the New York department. Mr. Fenton had been an industrial products sales engineer in the Boston and New York offices.

W. H. HAYES, formerly drilling superintendent of International Petroleum Co. in Peru and Colombia, has accepted a like position with Dunlap & Graham Drilling Co., Inc., and is now in charge of the company's drilling operations in Colombia. Dunlap & Graham spudded in its first well for Interco in the Barranquilla area in Colombia on Sept. 2, 1952.

G. W. HULDRUM, JR., has been appointed sales manager, eastern division, of Shell Chemical Corp., and V. C. Irvine has been named western division sales manager. Mr. Huldrum replaces J. G. Frye, resigned, while Mr. Irvine replaces Mr. Huldrum.

MILLARD E. STONE has been named director of industrial relations for Sinclair Oil Corp. and subsidiaries. For the past ten years he has been with Bendix Aviation Corp., South Bend, Ind.

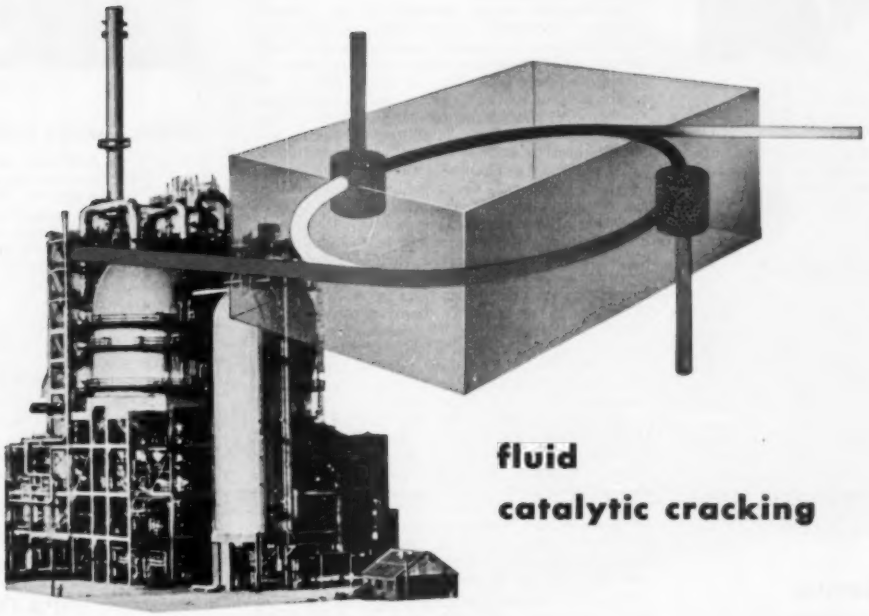
W. W. Albright

W. WAYNE ALBRIGHT, assistant manager, lubricating and sales technical service department of Standard Oil Co. (Ind.), was elected president of the National Lubricating Grease Institute at its recent annual meeting at Chicago. Mr. Albright joined Standard Oil as a member of the company's first sales engineering school in 1922. In 1946 he was made assistant to the manager of the lubricating department and became assistant manager of the technical service department in 1948.

ALBERT GREGERSEN has been named executive assistant (area manager) in the New York foreign production division of the Gulf Oil Corporation and will continue to act as that department's governmental relations advisor. E. E. Ferrin has been named technical advisor; C. W. Flagler, exploration advisor; L. C. Sass, assistant exploration advisor; and Wolfe J. Frankl, economic advisor.

OSBORN-OHIO
CAST STEEL REFINERY FITTINGS
FOR EXTRA SERVICE EFFICIENCY: TYPE 1000 MULE EAR FITTINGS
Cast in all types of steel for all pipe sizes, are of rugged construction, thoroughly dependable, and will give years of trouble free service.
All Osborn fittings are interchangeable with those made by Ohio Steel Foundry Co., being made in accordance with Ohio designs.
Catalogues will be sent upon request.
OSBORN
SAMUEL OSBORN & CO., LIMITED
CLYDE STEEL WORKS, SHEFFIELD

reaction in steel...



fluid
catalytic cracking

No matter how ideal the flow,
the process, in plant size,
must be contained and controlled in steel.

That's an important step in our job.
We've been doing it for over 30 years,—and
have designed, constructed and placed in operation
more than 600 petroleum processing units.

FOSTER WHEELER CORPORATION
165 BROADWAY, NEW YORK 6, NEW YORK

R. L. Bernhard

American Blower Appoints Bernhard

R. L. Bernhard has been appointed manager of the newly created centrifugal compressor department of the American Blower Corp. He has had more than 18 years of experience in the centrifugal compressor field.

Builds Storage Terminal

Construction of a 1,500,000-barrel oil storage terminal that will serve an area covering 3,000 square miles in Southern New Jersey with over a million population has been begun by Esso Standard Oil Co. The Paulsboro depot will occupy 36 acres on the Delaware River, 10 miles from the Camden-Philadelphia area. The plant is scheduled for completion in late 1953. A deep-water terminal, the plant will accommodate the new 225,000-barrel capacity super tankers. The new terminal is part of Esso's over-all tankage construction program that calls for the addition of more than 13 million barrels to the company's storage capacity along the East Coast by 1954.

New Ideco Catalog

A new condensed catalog covering the entire line of Ideco drilling, workover, and servicing equipment has been published by the Ideco division of Dresser Equipment Co., Dallas, Texas. This new bulletin contains 72 pages complete with detailed specifications, drawings, and photographs of the Hydrair hoists, power rigs, production equipment, rambler rigs, and matching auxiliary equipment including rotary tables, swivels, and blocks.

Magcobar Promotions

Four members of the Magcobar sales organization have recently been promoted, Willard M. Johnston, Magnet Cove Barium Corp. president, has announced.

Joe Webster has been promoted from Gulf Coast manager to assistant general sales manager. His headquarters will be at 123 Oil & Gas Building in Houston. He is succeeded by Ray Dillman as manager of the Texas Gulf Coast division. He has been division service manager of the Mid-Continent division at Tulsa. Ernest Howell has been appointed supervisor of District 3. Jack Walker has been named export salesman. Since joining Magcobar in February, 1949, he has been district supervisor at Victoria and has served in New Orleans, La., Farmington, N. M., and in Canada.

Joins Board of British Firm

John Maher, president of Oil Center Tool Co., Houston, Texas, has been elected a director of the English manufacturing firm of LeGrand, Sutcliff & Gell, according to an announcement from London by the board chairman, Mr. D. B. Mirk. LeGrand, Sutcliff & Gell, one of the largest manufacturers of oil field equipment in the United Kingdom, manufactures O-C-T products under a royalty arrangement in the sterling area.

Washington Dateline

(Continued from page 34)

men are concerned, lies in the Interior Department. Secretary Oscar L. Chapman and a score or more of his top advisers will retire. Just who will take over the Secretaryship won't be known until the new cabinet is named. In Washington speculation, Dan Thornton of Colorado is mentioned as a possibility, as is Senator Frank Carlson of Kansas.

When he leaves his cabinet post, Secretary Chapman also will give up his position as Petroleum Administrator, perhaps the only change that may be expected in top level PAD personnel as a result of the election. Presumably, the new Secretary of Interior will take the position of PAD head too.

In addition, every member of the Cabinet, scores of assistants to each member, men high in 100 or more government agencies, and a White House staff of several score, all are down to relinquish their jobs. The turnover will be the most sweeping one in 20 years, and to judge from the tenor of the recent campaign, will introduce an atmosphere of less hostility to industry and a less carefree attitude toward public spending.

To back up the change in the executive branch of the government, there will be a turnover in Congress. While the Republican majority in both the House and the Senate is razor-thin, it is enough to put party members in the chairmanships and in control of the various committees. At least a dozen committees took an active part in matters having direct bearing on petroleum.

Such Congressmen as Representatives John Taber, R., N. Y., Ben F. Jenson, R., Ill., and Senator Styles Bridges, R., N. H., will head up appropriations committees and subcommittees. Rep. Dewey Short of Missouri, once author of a "running-out-of-oil" report, will head up armed service matters along with Sen. Leverett Saltonstall of Massachusetts. Rep. Jesse P. Wolcott of Michigan and Sen. Homer E. Capehart of Indiana will handle price, rent, materials, and production controls legislation, among other matters. Senator Robert A. Taft of Ohio and Rep. Samuel K. McConnell of Pennsylvania will head up labor committees. Rep. Robert B. Chiperfield of Illinois and Sen. Alexander Wiley of Wisconsin will be chairmen of foreign affairs committees.

Commerce committees, which have much to do with petroleum and gas, will be under Sen. Charles Tobey, R., N. H., and Rep. Charles A. Wolverton, R., N. J., who were heads of the committees in 1947 and 1948 and held hearings on East Coast fuel supply. Wolverton took some committee members to Mexico at that time, and come back recommending a U. S. oil loan to Mexico. The Export-Import Bank finally lent $150 million, but said it was not for petroleum.

The incoming of the Republicans will be a new experience, both for the politicians and the people. While the GOP controlled Congress four years ago, not in 20 years has it had the responsibility and the power that goes with control of both Congress and the White House.

Tube Turns Buys Kerotest

All of the common stock of Kerotest Manufacturing Co., Pittsburg, has been bought by Tube Turns, Inc., of Louisville, Kentucky. Kerotest will continue to operate under its own name and present officers and personnel have been retained.

New officers will be George O. Boomer, chairman; John G. Seiler, vice president; and Robert J. Landolt, vice president, all of Tube Turns, Inc. Walter G. Swaney, incumbent vice president and secretary and J. D. Isaacks, vice president of Kerotest, remain in the same capacity. The presidency will be filled at a later date.

New Shale Shaker

Thompson Tool Co., Iowa Park, Texas, has begun production on a new vibrating-type shale shaker. Features include a sample machine which gives an accurate foot-by-foot analysis of the progress of the well; lifting bails to facilitate moving; a wash basin to wash and to clean both the operator's hands and the mud tools; a stationary water spray for washing down screen; and a tool cabinet built into the back of shaker.

R. H. Multhaup

Heads Kellogg Product Engineering

Robert H. Multhaup has been appointed manager of the product engineering department of The M. W. Kellogg Co. He will be in charge of the design and engineering of all fabricated products. Mr. Multhaup joined Kellogg last year as project engineer on rocket design work. For eight years previously he had been engaged in development work for the Elliott Co. where, as manager of the laboratory, he pioneered in the design of gas turbines for marine and locomotive use.

New Catalyst Plant

Houdry Process Corp. has placed in operation at Paulsboro, N. J., a plant for the manufacture of Type 3 catalyst to be used in Houdriforming operations for up-grading naphthas to high octane gasolines and in the production of aromatics. The Paulsboro plant initially will produce this new catalyst for Houdriforming plants now under construction having a total capacity of approximately 25,000 barrels per day and will fill future industry requirements for this catalyst.

NPA Offices

Officers of the National Petroleum Association elected to serve during the coming year are A. W. Scott, president of Wolfs Head Oil Refining Co., Oil City, Pa., president; Fred G. Bannert, Jr., president of Elk Refining Co., Charleston, W. Va., first vice president; and Paul R. Beck, president of Pennsylvania Refining Co., Butler, Pa., second vice president. Fayette B. Dow of Washington, D. C. remains as general counsel.

NOW . . . vital oil-field data!

VOLUMETRIC AND PHASE BEHAVIOR OF OIL-FIELD HYDROCARBON SYSTEMS

by M. B. Standing
California Research Corporation

This practical book collects into a single volume the widely scattered data on the behavior of hydrocarbon systems in petroleum reservoirs.

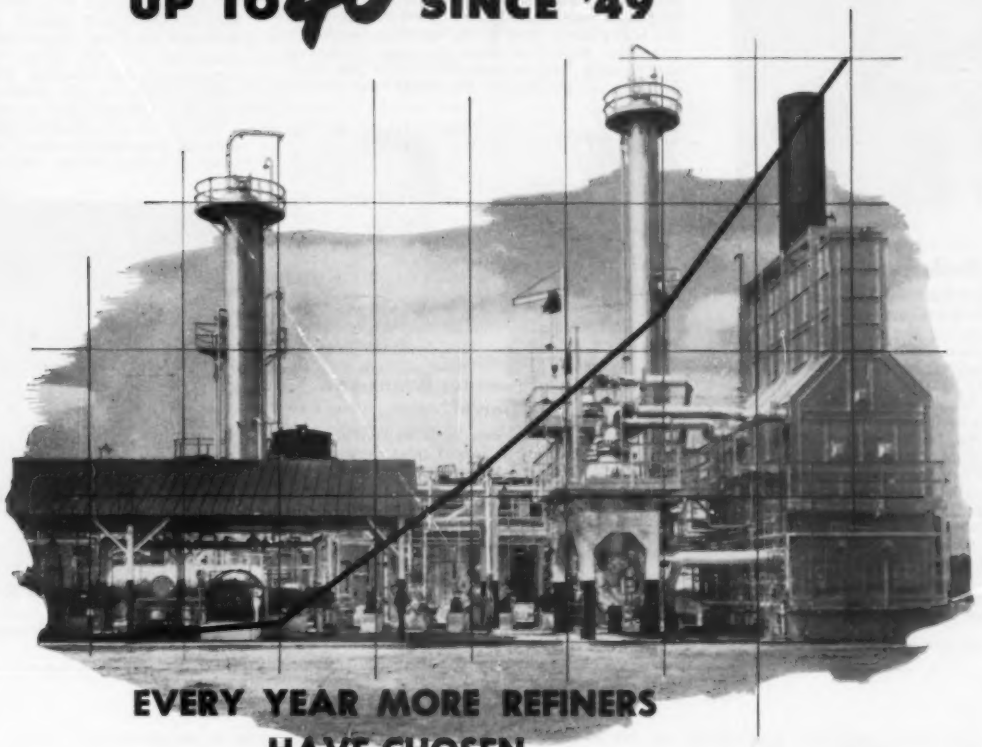
Primarily concerned with the composition and phase behavior of fluids, the book also discusses the physics of flow of oil and gas in reservoir rock and the application of laboratory data to various field conditions.

1952, 8½x11", 130 pages, **$10.00**

Order your copy today!

WORLD PETROLEUM BOOK DEPT.
604 Fifth Avenue New York 20, New York

UP TO 40 SINCE '49



EVERY YEAR MORE REFINERS HAVE CHOSEN

PLATFORMING

The acceptance of Platforming as the logical answer to reforming problems is reflected in the fact that 40 units are now on stream or in various stages of design and construction for refineries throughout the United States and foreign countries.

Because it is one of the most versatile processes ever developed Platforming successfully meets the many and varied requirements of the refiner in reforming low-grade naphthas. — It will make a high yield of high octane gasoline; high or low volatility can be obtained; the product Platformate requires no special treatment and can be stored separately or blended directly with other refinery gasolines; and, highly important, Platforming has the aromatics option so that the refiner can convert from motor fuel to aromatic production.

Yes, there are good reasons why more and more Platforming units are dotting the world's refineries.

UNIVERSAL OIL PRODUCTS COMPANY

30 EAST ALGONQUIN ROAD, DES PLAINES, ILL., U. S. A.

Laboratories: RIVERSIDE, ILLINOIS

Universal Service Protects Your Investment

H. C. Conners

Graver Promotes Conners

Harold C. Conners has been appointed assistant to president E. N. Gosselin, president of Graver Tank & Manufacturing Co., Inc., East Chicago, Ind. Mr. Conners has been with Graver for more than 16 years. Early in his career, Mr. Conners served as manager of Graver's bulk tank sales and later as chief engineer of the company's Sand Springs, Okla. plant.

During World War II, Mr. Conners spent four years as a member of the Army Air Force, including 23 months overseas in the European and Mediterranean theaters. He was recalled to active duty in August 1950, and distinguished himself as director of combat operations of the 315th Air Division in Korea. He was awarded the Legion of Merit, Oak Leaf Clusters to the Bronze Star and Air Medals and other decorations for his outstanding work in airborne operations and air drop resupply.

Launches Supertanker

The *SS Waneta*, largest addition to the deep sea fleet operated by Socony-Vacuum Oil Company, Inc., was launched Sept. 25 at the Quincy, Mass. yards of Bethlehem Shipbuilding Co. The vessel has a capacity of 254,800 barrels, a length of 644 feet, breadth of 84 feet, depth of 44 feet, draft of just under 33 feet, and a deadweight of 29,250 tons, compared with 27,000 tons for the seven "super-tankers" completed in 1950. Powered by geared turbines, she has a speed of 16½ knots. She will carry a crew of 69, including 14 officers.

Another tanker, of about the same dimensions and capacity, will be delivered by the Sun Shipbuilding Co. at Chester, Pa., early next year.

H. J. Evans *R. J. Sarraf*

Rockwell Promotes Evans and Sarraf

Howard J. Evans has been appointed chief engineer and Robert J. Sarraf chief chemical engineer of Rockwell Manufacturing Company's meter and valve division.

Mr. Evans was employed in the geophysical department of Humble Oil & Refining Co. and Standard Oil Co. (N.J.) before joining Rockwell in 1935.

Mr. Sarraf did research work at the Mellon Institute of Industrial Research until 1947 when he joined Rockwell as a chemical engineer.

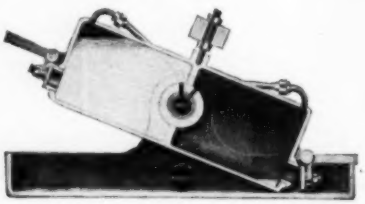
Bettis Succeeds T. M. Johnston

W. F. Bettis has been appointed vice president in charge of West Coast operations and foreign sales for Johnston Testers, Inc. He succeeds T. M. Johnston who was transferred to Houston as executive vice president.

Mr. Bettis started in the oil fields with Wilshire Oil Co. at Santa Fe Springs in 1928. He developed the export sales department for the M. O. Johnston company in 1934 and later became vice president and general manager of M. O. Johnston Oil Field Export Corp. With the purchase late in 1951 of M. O. Johnston's four corporations by Johnston Testers, Inc., he retained charge of the export division and was elected a vice president of the new company.

Mr. Bettis is a founder-member and the first national secretary-treasurer of Nomads and was twice president of the Los Angeles chapter.

W. F. Bettis



Draining from vacuum down to 29 inches

This 'Ogden' Vacuum Trap is an extremely simple apparatus for draining from vacuum without auxiliary assistance.

It has a smooth continuous draining and discharge action, similar to that of a double-acting pump. It is suitable for greasy, non-greasy, and certain acid or alkaline conditions of water.

It cannot lift its discharge (when there is lifting to be done the 'Ogden' Automatic Pump is the thing to use). But when lifting is not required this Vacuum Trap is an entirely reliable method of draining oil separators, evaporators, the low-pressure stages of turbines, vacuum stoves, vacuum filter receivers, or any other apparatus under vacuum.

For a copy of Pamphlet No. 119, giving a full description, please write to: SPIRAX MANUFACTURING CO., LTD., (Petroleum Dept.), CHELTENHAM, ENGLAND.

BOOKS

PHYSICAL PRINCIPLES OF OIL PRODUCTION—Morris Muskat $15.00

PRACTICAL OIL GEOLOGY—Dorsey Hager ..... $ 7.50

PRACTICE OF LUBRICATION—T. G. Thomsen ..... $ 8.00

PETROLEUM PRODUCTION ENGINEERING—L. C. Uren
"Oil Field Development" ..... $ 8.00

PETROLEUM PRODUCTION ENGINEERING—L. C. Uren
"Oil Field Exploitation" ..... $ 8.00

PETROLEUM PRODUCTION ENGINEERING—L. C. Uren
"Petroleum Production Economics" ..... $ 7.50

PETROLEUM REFINERY ENGINEERING—N. L. Nelson ..... $ 9.00

PETROLEUM PRODUCTION (5 Volumes)—Park J. Jones
Vol. I—Mechanics of Production: Oil, Condensate and Natural Gas, 1946 ..... $ 5.00
Vol. II—The Optimum Rate of Production, 1946 ..... $ 5.00
Vol. III—Oil Production by Water, 1947 ..... $ 5.50
Vol. IV—Condensate Production and Cycling, 1948 ..... $ 5.50
Vol. V—Oil Production by Gas & Flooding, 1948 ..... $ 6.00

PRINCIPLES OF PETROLEUM GEOLOGY—Wm. L. Russell ..... $ 7.00

PRINCIPLES OF SEDIMENTATION—2nd Edition—W. H. Twenhofel ..... $ 7.00

PETROLEUM CHEMICALS INDUSTRY—Richard Frank Goldstein ..... $ 8.50

ROTARY DRILLING HANDBOOK—5th Edition—Brantly $10.00

SAFETY IN PETROLEUM REFINING & RELATED INDUSTRIES—
George Armistead, Jr. $10.00

THE SCIENCE OF PETROLEUM, Vol. 5, Pt. I,
Crude Oils—Benjamin T. Brooks and A. E. Dunston $11.00

THEORY AND PRACTICE OF INDUSTRIAL RESEARCH—
David Bendel Hertz ..... $ 5.50

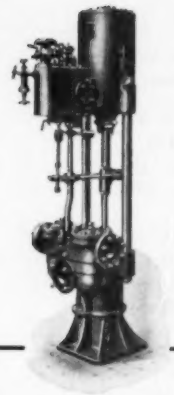
WORLD GEOGRAPHY OF PETROLEUM—edited by Wallace E. Pratt and Dorothy Good ..... $ 7.50

TO ORDER, WRITE TO:

BOOK DEPT. WORLD PETROLEUM
604 FIFTH AVE., NEW YORK 20, N. Y.

using every unit of energy

BOILER FEED PUMPS



"Hall" Boiler Feed Pumps are designed to make use of every unit of energy from steam before it is passed to exhaust. Of the Vertical Single Cylinder Direct and Double-Acting type, the standard range covers capacities from 250 to 10,000 gallons per hour. Over 50 years specialist experience is behind these pumps, plus first class materials and workmanship. TURBINE Driven Centrifugal Feed pumps are available for duties from 4,000 to 35,000 gallons per hour.

PUMPS FOR HANDLING OIL IN BULK

HALL PUMPS

For reliability and efficiency with maximum economy in operation, "Hall" Horizontal Duplex and Horizontal Compound Duplex type pumps are unsurpassed. The "Hall" Compound Duplex Pump is specially designed to give minimum steam consumption.

An efficient and comprehensive record system ensures the correct and prompt supply of spares and replacements, cutting maintenance time to a minimum and simplifying routine overhauls.

J. P. HALL & SONS LTD. PETERBOROUGH ENGLAND

P.2440

BOOKS

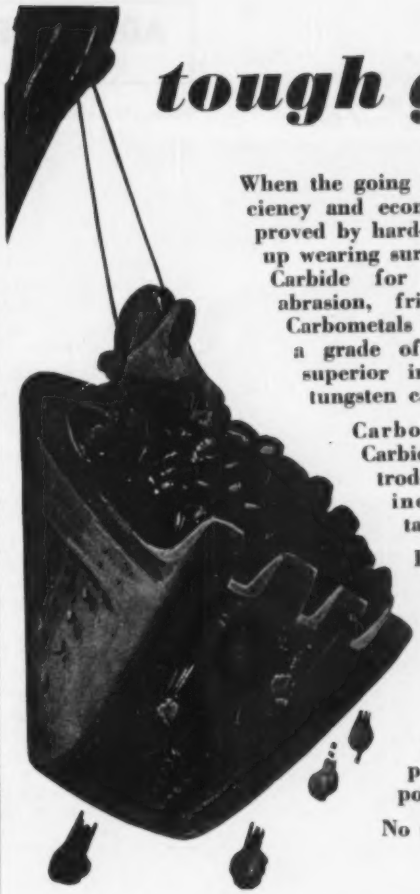
PRACTICAL ACCOUNTING FOR OIL PRODUCERS—Robert William Pritcher	$ 9.50
ALKYLATION OF ALKANES—Gustav Egloff & George Hulla	$22.50
AMERICAN OIL OPERATIONS ABROAD—Leonard Fanning	$ 5.00
CORROSION HANDBOOK—Herbert H. Uhlig	$12.00
CHEMISTRY OF PETROLEUM DERIVATIVES—Carleton Ellis Vol. I	$20.00
Vol. II	$22.50
CONVERSION OF PETROLEUM—A. N. Sachanen	$12.00
CHEMICAL REFINING OF PETROLEUM—V. Kalichevsky & Stagner	$ 8.25
CHEMICAL ENGINEERS' HANDBOOK—John H. Perry (revised 3rd edition, 1950)	$17.00
CORROSION (Causes and Preventions)—Frank N. Speller	$10.00
THE CHEMICAL PROCESS INDUSTRIES—R. N. Shreve	$ 9.00
CHEMICAL ENGINEERING ECONOMICS—C. Tyler	$ 4.50
CHEMICAL ENGINEERING PLANT DESIGN—F. Vibrandt	$ 7.00
CHEMICAL TECHNOLOGY OF PETROLEUM—Cruse and Stevens	$ 8.50
DISRUPTED STRATA—M. H. Haddock	$ 4.25
DISTILLATION—Interscience Publishers, Inc.	$14.00
ELEMENTS OF FRACTIONAL DISTILLATION—Robinson & Gilliland (4th Edition)	$ 7.50
EMULSIONS & FOAMS—Berkman & Egloff	$12.00
ELECTRICAL ENGINEERING—E. E. Kemberley	$ 5.25
THE FISCHER TROPSCH AND RELATED SYNTHESES—H. H. Storch, N. Golumbic and R. B. Anderson	$ 9.00
ELEMENTS OF OIL RESERVOIR ENGINEERING—Sylvain J. Pirson	$ 7.50

TO ORDER, WRITE TO:

BOOK DEPT. WORLD PETROLEUM

604 FIFTH AVE., NEW YORK 20, N. Y.

tough going



When the going is really tough, efficiency and economy is greatly improved by hard-facing and building up wearing surfaces with Titanium Carbide for protection against abrasion, friction and impact. Carbometals Ltd. have developed a grade of Titanium Carbide superior in every respect to tungsten carbide.

Carbometals' Titanium Carbide Hand-facing Electrodes give the following incomparable advantages:

Hardness and toughness. (Hardness figures of up to Rockwell A87 easily obtainable)

Greater abrasion-resistance.

Homogeneous Deposits — free from porosity.

No thermal cracking.

- **Can be deposited directly onto any steel, including Manganese steel.**
- **Carbometals Ltd. also manufacture**
- **All sizes of core-heads and special core-heads for fragile formations.**
- **Fishtails, Drag Bits and Diamond-impregnated products.**

Carbometals LTD

Aquila Street, London, N.W.8. England. Tel Primrose 2265. Cables Carbometals London.

ADVERTISER'S INDEX

(Advertising Agencies in Italics)

Anglo-Iranian Oil Co. Ltd. 61
S. H. Benson, Ltd.

Atlantic Refining Company 22-23
N. W. Ayer & Son, Inc.

Audley Engineering Co. Ltd. 8
Marsteller, Gebhardt & Reed, Inc.

Automatic Telephone & Electric Co. Ltd. 57
Dorland Advertising Ltd.

Bechtel Corporation 20
Ryder & Ingram Ltd

Bethlehem Steel Company 10
Gotham Advertising Co., Inc.

The Butterley Co. Ltd. 9
Rowlinson-Broughton

California Texas Oil Co., Inc. 4
Cunningham & Walsh, Inc.

Cape Asbestos Co. Ltd. 59
Industrial Publicity Service Ltd.

Carbometals Ltd. 77
Rooster Publicity Ltd.

Chicago Bridge & Iron Co. 80
Russell T. Gray, Inc.

The Cooper-Bessemer Corporation 79
The Griswold-Eshleman Co.

Crane Company 14
The Buchen Company

Dresser Industries, Inc. 18-19
Laughlin-Wilson-Baxter & Persons

Dunlop Rubber Co. Ltd.
G. R. G. Overseas Division 12
Dunlopillo Division 65
Charles F. Higham Ltd.

E. I. du Pont de Nemours & Co. 53
Charles L. Rumrill & Co.

English Electric Co. Ltd. 21
Service Advertising Co. Ltd.

Flexible Drives (Gilman's) Ltd. 62
Boswell & Barratt Ltd.

Foster-Wheeler Corporation 73
Albert Frank-Guenther Law, Inc.

Graver Tank & Manufacturing Co., Inc. 3
Simmonds & Simmonds, Inc.

Gulf Oil Corporation 24
Young & Rubicam, Inc.

J. P. Hall & Sons Ltd. 77
Rooster Publicity Ltd.

Halliburton Oil Well Cementing Co. 30
Hill & Christopher, Inc.

Imperial Chemical Industries Ltd. 69
Clifford Martin Ltd.

International General Electric Co. 48
Grant Advertising, Inc.

International Harvester Export Co., Inc. 13
McCann-Erickson Corporation

International Paints Ltd. 78
Mayfair Advertising Agency

The M. W. Kellogg Company 26-27
Gordon Baird Associates, Inc.

Wm. Kenyon & Sons Ltd. 11
Rowlinson-Broughton

Lake & Elliot Ltd. 69
Ripley Preston & Co. Ltd.

Lane-Wells Company Cover II
Darwin H. Clark Co.

The Lummus Company Cover III
Harris D. McKinney Organization

McCullough Tool Company 7
Richard P. Casterline Advertising

Arthur G. McKee & Co. 66-67
Meermans, Inc.

Magnet Cove Barium Corporation 17
Rives, Dyke & Company

Moon Brothers Ltd. 63
Donald MacDonald (Advertising) Ltd.

A. P. Newall & Co. Ltd. 1
Osborne-Peacock Co. Ltd.

Newman, Hender & Co. Ltd. 16

Nordstrom Valve Division, Rockwell Manufacturing Co. 8
Marsteller, Gebhardt & Reed, Inc.

Samuel Osborn & Co. Ltd. 72

D. & C. & William Press Ltd. 68
Taylor Advertising Ltd.

The Pyrene Co. Ltd. 2
Nelson Advertising Service Ltd.

Schlumberger Oil Well Surveying Co. 47
Rives, Dyke & Company

Socony-Vacuum Oil Company 15
Compton Advertising, Inc.

Spirax Manufacturing Co. Ltd. 76
Harry Dawson Advertising Ltd.

Standard Oil Company (N.J.) 51
McCann-Erickson Corporation

Standard Vacuum Oil Company 71
Sam J. Gallay Advertising

John I. Thornycroft Ltd. 65
Motor & Technical Power Publicity Ltd.

Timken Roller Bearing Company 25
Batten, Barton, Durstine & Osborn, Inc.

Universal Oil Products Co. 75
Simmonds & Simmonds, Inc.

Westinghouse Electric International Co. 28
National Export Advertising Service, Inc.

Worthington Corporation 6
James Thomas Chirurg Co.

Wyatt Metal & Boiler Works Cover IV
Wallace Davis & Company

Youngstown Sheet & Tube Co. 5
The Griswold-Eshleman Co.

THERE'S MORE IN THIS THAN MEETS THE EYE

To the average man one brand of oil looks much like any other but the oil technician knows only too well the difference there is between a bad oil and a good oil. The best are those specially designed for the job they have to do. Research and technical control alone makes that possible.

Paints also may look alike but there is a world of difference between "paint" and the *right paint for the job*. All "International" products are the result of research and technical control—they are made for the job—YOUR JOB.

"TANCTECTOL" petrol-resistant paint for protecting interiors of storage tanks, is but one "International" product in wide use throughout the petroleum industry.

Ford Cup used for viscosity tests.

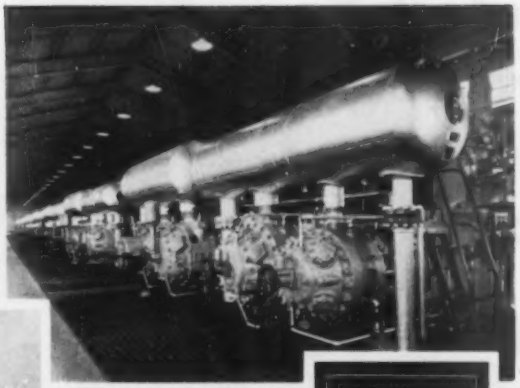
REGISTERED TRADE MARK

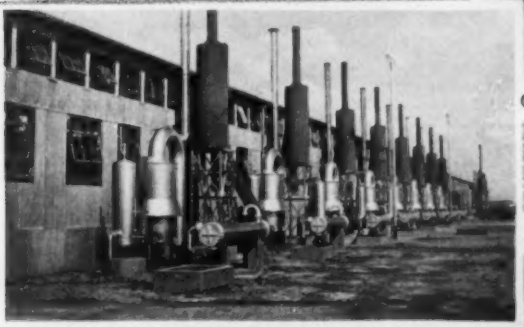
International Paints Ltd.

GROSVENOR GARDENS HOUSE, GROSVENOR GARDENS, LONDON, S.W.1. Tel: VICtoria 3161 (10 lines)

ASSOCIATED COMPANIES AND AGENTS THROUGHOUT THE WORLD.

How they lined up efficiency

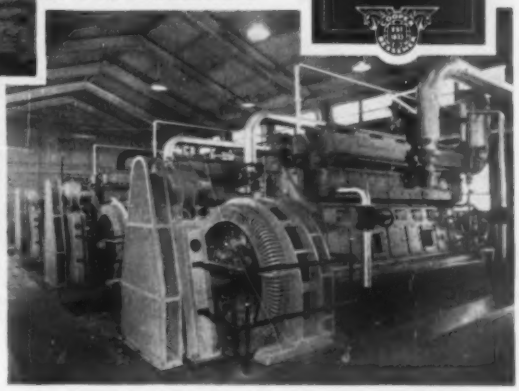




GMV'S FOR COMPRESSING

JS' FOR GENERATING

Another Example of Efficient Power at Lower Cost



to save dollars at Dollarhide

● The Dollarhide Plant, operated by The Pure Oil Company, is a "beautiful" plant, say those who have seen it—one of the newest, most efficient gasoline plants today.

Those Cooper-Bessemer GMV compressors and JS gas engines do make an impressive line-up, but more important, they *line up* a combination of reliability and efficiency you just can't beat. That's why they're on this and so many other important jobs.

The compressor line consists of eight 10-cylinder GMV's, all supercharged, for a total of 10,040 compressor hp (at 3150' elevation). Each is a 3-stage compressor, zero suction to 650 lbs. discharge, with automatic speed control and manually operated unloading. This minimizes maintenance and attention without risking a suction pressure drop that would allow air to enter the sour gas stream.

There are modern Cooper-Bessemer V-angles . . . GMV's, GMX's and GMW's from 220 to 3,000 bhp . . . that will efficiently meet your needs no matter how exacting or complex.

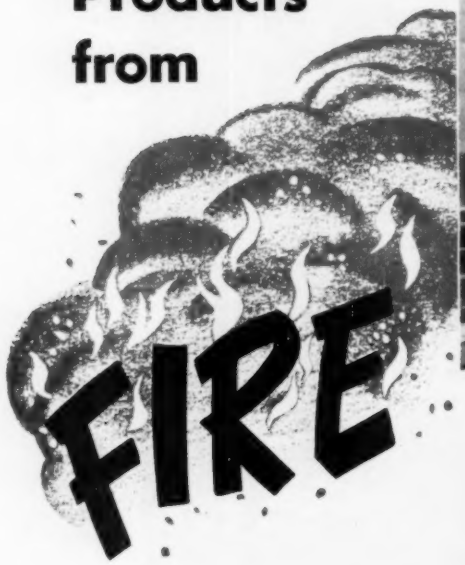
The
Cooper-Bessemer
Corporation

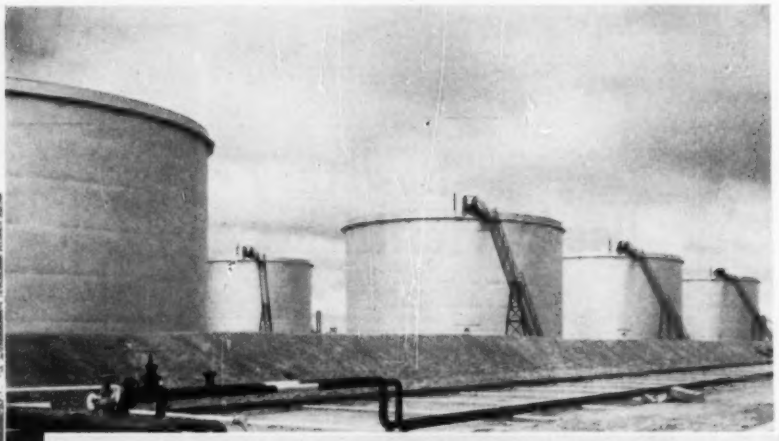
MOUNT VERNON, OHIO — GROVE CITY, PENNA.

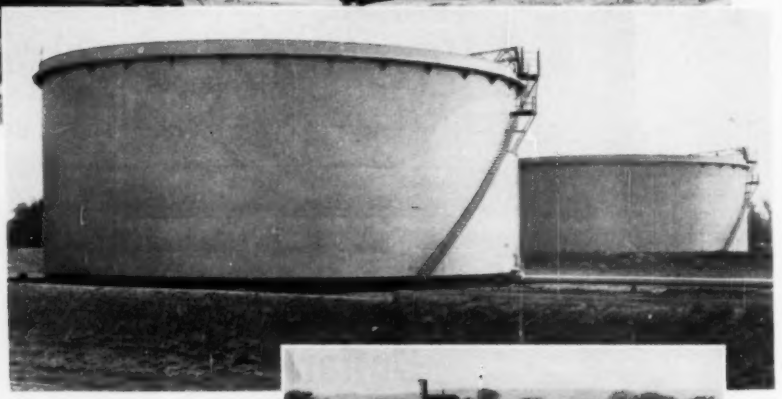
New York, N. Y. Washington, D. C. Bradford, Penna. Parkersburg, W. Va.
San Francisco, Calif. Houston, Dallas, Greggton, Pampa and
Odessa, Texas Seattle, Wash. Tulsa, Okla. Shreveport, La.
St. Louis, Mo. Los Angeles, Calif. Chicago, Illinois Caracas, Venezuela

HORTON Floating Roofs

Protect Your Petroleum Products from







At Refineries

Throughout the world, petroleum refineries depend upon Horton Floating Roofs to cut down the fire hazard in tanks storing highly flammable liquids. The top view shows tanks equipped with Horton Pontoon Floating Roofs at a large refinery in South America.

On Pipe Lines

A pipe line shipping a variety of petroleum products through its lines is faced with the problem of efficient storage . . . and the fire hazards due to the flammability of the liquids they handle. The center view above shows two 81,000-bbl. tanks equipped with Horton Double-Deck Roofs built for the Mid-Valley Pipe Line Company near Hebron, Kentucky.

At Terminals

The view at right shows a 6,500-bbl. tank equipped with a Horton Double-Deck Floating Roof at the General Petroleum Corporation's Sacramento terminal. Tanks equipped with Horton Floating Roofs provide terminals with protection against filling and breathing evaporation losses as well as reduce the fire hazard.

No Air—No Fire

Horton Floating Roofs float directly on the surface — the entire bottom of the roof normally being in contact with the liquid in the tank. There is no space above the liquid for vapor to form. Oxygen is unable to reach the liquid to support combustion or encourage fire. Explosive vapors in the area are reduced — fire hazard is kept to a minimum. Evaporation losses and corrosion are also reduced.

Horton Floating Roofs are built in three types—Double-Deck, Pontoon, and Pan. Write our nearest office for further information or quotations on any of the three.

CHICAGO BRIDGE & IRON COMPANY

Chicago • Houston • Tulsa • San Francisco • Birmingham • Atlanta • Cleveland • Philadelphia • Los Angeles • Boston • Seattle • Detroit • Washington
Plants: Birmingham, Chicago, Salt Lake City and Greenville, Pa., U.S.A.
Export Office—165 Broadway Building, New York 6, N. Y., U.S.A.

REPRESENTATIVES AND LICENSEES

Ateliers et Chantiers de la Seine Maritime, Paris, France
Construction Metalliques de Provence, Arles-sur-Rhone, France
Comprimo N.V. 21, Amstel, Amsterdam(C), Netherlands
Compagnia Tecnica Industria Petroli, Rome, Italy
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Wbessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Horton Steel Works, Limited, Fort Erie, Ontario, Canada
W. P. Bryant, Edificio Abreu 402, Havana, Cuba
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704 C, Rio de Janeiro, Brazil

The only evidence of Lummus at this stage of the project is a team of 'dozers doing initial clearing. But soon it will be a completely-integrated petroleum refinery . . . or a modern chemical plant . . . or petroleum chemical units employing the newest and best processing concepts.

Meanwhile, the earth-movers are prophetic. They signal the application of Lummus' complete one-contract, one-responsibility engineering service from initial studies through acceptance run. And the trademark they wear means that *every* Lummus man who has a hand in the project has a strong and steady desire to make *this* the best job ever turned out by the company.

Isn't this the spirit, quality and depth of technical talent you'd like to engage for your next project? You'll find it in abundance at Lummus. If you use it, you put into force the strongest guarantee of a modern, flexible, efficient, profitable plant.

THE LUMMUS COMPANY

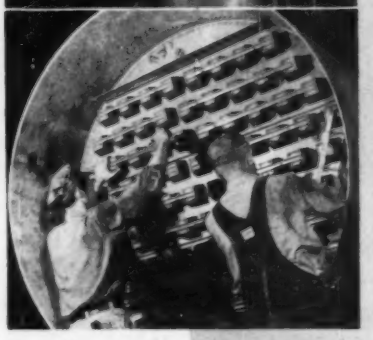
385 MADISON AVENUE, NEW YORK 17, N. Y.

HOUSTON • CHICAGO • LONDON • PARIS • CARACAS

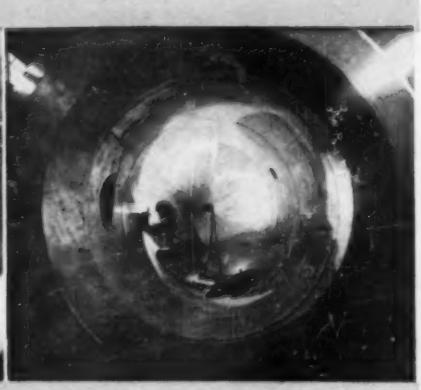
DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

At Wyatt's

• The Fine Art of Turning Out Meticulous Jobs Is All In A Day's Work



• Fabricating unusual designs to Engineering Contractor specifications is commonplace in our plants. Pictured here are five products which may well have gone through simultaneously. Beginning top left, they are: An aluminum pressure vessel, requiring welding by the "inert Gas Process" . . . Installation of bubble trays in a section of an 8' diameter tower, eliminating extra field cost . . . A set of Buell cyclones, made entirely of stainless steel, for installation in a large regenerator . . . A portion of a saturator for a steel mill . . . and, inside view of a reactor fabricated of alloy, the interior of which required such a high polish that all seams were ground and polished to a No. 4 finish.

STEEL PLATE
FABRICATORS
AND ERECTORS
SINCE 1913

Wyatt's
HOUSTON · DALLAS · NEW YORK · TULSA